FOOD INDUSTRIES

SEP - 9 1935

ROASTING COFFEE

SEPTEMBER, 1935

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FOOD INDUSTRIES

PRODUCTION • ENGINEERING • DISTRIBUTION

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WHICH WILL WIN?

WHEN competition for consumer buying is at stake—when the buyer leans over the counter and points a finger at the package of his choice, does he point at yours? Sales may be running neck and neck with competition but if the package hasn't that "come-hither and buy-me" look it doesn't register. Heekin metal containers, beautifully lithographed, may lift your product out-in-front in the race for business. Any color, all colors are perfectly reproduced. May we work with you? The Heekin Can Company, Cincinnati, Ohio.

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CANS
WITH HARMONIZED COLORS

FOOD INDUSTRIES

PRODUCTION • ENGINEERING • DISTRIBUTION

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Vol. 7, No. 9

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Laurence V. Burton, Editor

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SEPTEMBER 1935

THE TALK OF THE INDUSTRY

TENDERIZING NOTE: A grave gentleman walked into our office last week with a large juicy, "tenderized" rubber washer that had come into his possession via the route of a carton of "tenderized" prunes. What happens to rubber in a prune "tenderizing" plant is really remarkable. It makes one wonder if rubber would not be an excellent test medium for laboratory controls.

AMONG the readers of FOOD INDUSTRIES there are "poets" who have deluged us with verses about the new Wisconsin law that was introduced by Assemblyman William Sweeney to compel cheese and butter to be served with every 25-cent meal —all because in July we incautiously expressed the belief that somebody ought to be able to write a jingle about it. Nearly everybody had "Sweeney'" rhyme with "meanie," but after getting that far the candidates nearly ruined their poetic licenses. We dare not permit our poetic license (fourth grade) to be busted by trying to rhyme such incompatibles as "rebel" with "hell."

CONSIDER Mussolini (to turn aside to the higher things of life). Sooner or later all dictators become intoxicated by their own self importance. Mussolini stands to lose even if he completely exterminates the Ethiopians, and if by some strange turn of fate they should defeat the Italians, as has happened once before, Italy may become the laughing-stock of the world.

A man fighting with a small boy is ever at a terrific moral disadvantage. Maybe the King of Italy will get his old job back again.

But in the meantime, buying agencies for the Italian government have been seeking bids on processed foods in the United States. One bonafide order for two millions pounds has been dangled in front of one of our friends. Not bad. Not bad. In fact —not half bad until you begin to wonder what Italy will use for money. According to stories around financial New York, Italy's credit is only about one-half of one per cent better than Ethiopia's. But that was before Emperor Haile Selassie put out the story that he had cash money buried all over the place.

EVERY month we get quite a kick out of reading the reports of holdings of corporation shares which are made public by the S.E.C. Thus, we have learned that in June, a director of Canada Dry got rid of 1,200 shares; that two officers of General Foods let go a total of 1,000 shares; a Kroger officer let go of 500 shares; and a director of Loose-Wiles cut his holdings there by 2,400 shares; that a director of National Biscuit Co. got out from under 21,250 shares; that some of the folks in National Dairy Products sold or gave away 1,878 shares; that a big stockholder in Procter & Gamble gave away 1,000 shares; that an officer of Standard Brands ditched 3,125 shares; that an officer of United Fruit Co. reduced his holdings by selling 5,000 shares and that an officer of Spencer Kellogg & Son cut down his holdings by 300 shares.

Dear, dear! The boys must have needed a little spending money for summer vacations.

REPRESENTATIVE MORITZ of Pennsylvania has introduced a bill into Congress, H.R.8808, to require every editorial article in any publication to be signed by the name of the writer. With fierce resentment we turn on such an unwarranted violation of our editorial privacy. That so-called statesman would even kalsomine a lily.

DISTRIBUTION NOTE: Nearly every morning about 5:30 an old klunk of a milk truck, bearing the figure 16, parks near this department's bedroom window for 20 minutes with its engine running, while the driver is elsewhere. A blown gasket on its exhaust manifold emits a hiss of derision at every other revolution of the engine. And just about the time we are ready to commit mayhem on the driver, or call a police radio car, it moves away.

This truck belongs to the same dairy company which won the FOOD

INDUSTRIES' prize for the worst alibi in March for telling a neighbor that rope in her milk was caused by malicious persons squeezing lemon juice into her bottles on the doorstep.

If that driver-salesman ever calls at our home to sell us his wares, we have saved up for him a special brand of sales resistance that is a combination of the worst that we learned in the rolling mill and in the stockyards.

Come on No. 16!

Effect of an Unbalanced Budget

THE current furore about balancing the federal budget, increased taxation, "reform," outrageous spending of money by the government and the dubious constitutionality of many of the New Deal measures must not distract anybody's attention from the fundamental problem which confronts everyone of us.

Unless Providential circumstances intervene, we must endure a continuation of these administration policies for another year and a quarter—perhaps considerably longer.

To balance the budget now requires either reduced expenditures or increased taxation, both of which are politically inexpedient just before an election. That probably means that the budget will not be balanced until after January, 1937.

Taken alone, that possibility need not necessarily be an economic calamity. But we are surely nearing the point when the interest charge on the increasing national debt will reach such staggering proportions that taxation cannot yield enough revenue to pay it in addition to the normal operating expenses of good government. Many countries in recent times have learned to their sorrow that there is a limit to the total sum that can be raised by taxation. England, for example, found out about fifteen years ago that increasing the rate of taxation actually produced *less* net revenue!

When the time approaches in which everyone finds out that taxation is not going to be able to meet the cost of government plus interest charges on the public debt, there are two probable courses open to the government: it may inflate the currency by putting out irredeemable paper money which is but a temporary expedient and will only defer heroic measures for a matter of months; or it may plunge us into one of the many modifications of socialism wherein the individual must serve the state instead of the state serve the individual. Liberty will be gone.

The second step appears to be the more likely one if the Roosevelt administration remains in power, for as long as "reform" is always coupled with or placed ahead of "recovery" it is clear to any astute thinker where Mr. Roosevelt is heading. Nevertheless, inflation or further currency devaluation may come as an intermediate step and in anticipation of such a step executives should be planning their defensive moves. Nobody can overlook the fact that a public debt great enough may have serious repercussions on business and our form of government. It is possible for a government to spend itself into a revolution.

The Social Security Law

SOCIAL security is on the way, on paper at least, now that the President has signed the new law. If it works out as its creators have planned it will be a forward step in social progress that will merit the approval of every one, even FOOD INDUSTRIES. Critical though we may be, we have no quarrel with its purpose. We sincerely hope that it works.

Any weakness in the plan seems to us to lie in the management of the enormous reserves to be set up. The number of men available today who may be safely entrusted with the handling of a $50,000,000,000 fund in such a way that the fund remains intact and yet can be drawn upon in time of need is exactly zero. Wisdom and honesty are not synonymous terms. However, by the time the fund reaches astronomical proportions we may be able to train men to handle such vast resources.

In the meantime all we need to do is pay the payroll deductions and hope for the best. But let no man develop any false ideas of security because of this law. If, in the years to come, the trustees of the fund have

Hors d'Oeuvres

• *If you can't afford to eat five times a day, here's another way to increase your fag-end-hour efficiency. Bireley's, Inc., citrus-juice processors in Hollywood, tune in radios to give a second-wind to employees engaged in monotonous work.*

• "Sauerkraut is going to play an important part in the beautification of women in the near future," says a National Kraut Packers' Association official. We suppose the idea is to give the girls a sauerkraut figure.

• *Bacon sold for eight dollars a pound in Pennsylvania during the Revolution. Judging from that and present meat prices, the New Deal must be somewhat of a revolt.*

• Deep-sea fish, reports Dr. William Beebe, are strongly attracted by a beam of ultra-violet light. Which just goes to show the far-reaching effects of food manufacturers' vitamin-D publicity.

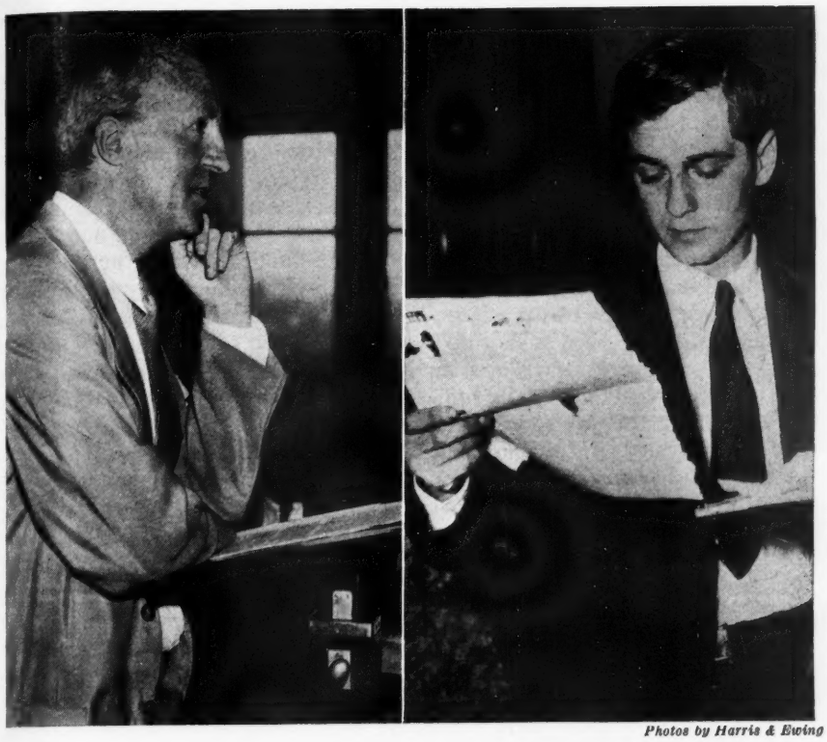
• *Italy has been buying enormous quantities of lemons to keep her soldiers in trim. Wars would be a good thing for the food business if it weren't for the incidental fact that when they're over there are a lot less people who need to eat.*

• The AAA (American Automobile Association) is getting fed up with being confused with the AAA (Agricultural Adjustment Administration). Maybe tourists get the idea that an "approved by AAA" restaurant is one which limits the food supply.

• *There was inaugurated on Aug. 1 a nation-wide service, Telefood, whereby gift baskets of groceries can be sent by wire. But if you say it with food to a girl who's too thin, she'll be insulted. And if she's not too thin, don't tempt her with eats!*

• Though the production man has little to do with merchandising problems, there is one aspect of the chain-store discount squabble about which he should have something to say. That is the tendency on the part of the sales executive to give a too generous allowance and then demand a cut in manufacturing costs to make it up.

• *Confectioners plan to establish a national candy day. Verily, 'twill be a great day for suckers.*



Photos by Harris & Ewing

Two well-known witnesses testifying at the Copeland Food and Drug Bill hearing before the House Committee. Left, Charles Wesley Dunn, attorney for AGMA. Right, America's No. 1 Professional Consumer, Arthur Kallet.

to dump their investments on the market to realize cash for benefits, whatever depression then exists will be magnified ten-fold.

The AAA Mess

BY THE TIME these words are read there will be approximately 1,200 injunction suits to restrain the Secretary of Agriculture from collecting further processing taxes under AAA, the constitutionality of which has been variously appraised by every sort of federal judicial court except the Supreme Court.

Stalling for time, exhorting, lambasting, and using every means within its grasp, the Administration is striving to avoid the final adjudication before the highest tribunal in the land. It's NIRA all over again, where the Administration was afraid to go to court against the first class fighting he-man outfit, like the Weirton Steel Co. or the Houde Engineering Co., but finally picked on a little firm of Jewish boys who slaughtered chickens, a firm that nobody ever heard about. And what a burning it got!

Regardless of the future verdict of the court, the appraisal of history will be that of a lost opportunity and wasted funds. From Secretary Wallace down through Tugwell, Wilson, Frank, Davis, et al., all are trifling and toying with a problem that needs definite and final measures.

There is only one permanent cure for agricultural over-production in this country and that is the retirement of the 50,000,000 surplus acres. But even today Wallace is trifling with an amendment to give him autocratic power to regulate the food processes.

Why not get rid of the surplus acreage and stop fooling with silly regulations? Or why regulate the food processors, why not regulate the farmers?

Free Food—A Real Competitor

MANY a manufacturer of foods has been perplexed by the softness of the market at a time when prices would be expected to be rather firm. From H. F. Taylor has come the suggestion that the clue to the problem is found in the huge amounts of food that are given away for relief purposes.

No one can take exception to the principle of feeding the hungry, but business has not been able to take account of this form of new competition in programming its own operations. In particular it was working in the dark when the government was processing and distributing the products of livestock salvaged at ruinous prices in the drought areas in 1934.

Believing that information of the extent of distribution of relief foods is of fundamental importance, FOOD INDUSTRIES published the first available figures up to Dec. 31, 1934, in the June, 1935, issue. And now another batch of figures is available elsewhere in this issue. Even a hasty glance at the table on page 435 will impress anyone with the enormous amount of food that is being given away.

Yeast in the Newer Agriculture

SOME time back there was a conference at Dearborn, Mich., under the aegis of Henry Ford, who is perennially interested in doing something for agriculture. Doubtless he had fallen hard for the speculations contained in a book, "The Farm Chemurgic" — which, translated, means "chembecilic."

Be it remarked, parenthetically, there is nothing like prosperity to stimulate "broad" thinking. The more prosperity, the more broadness; and that is the way corporations take on fat. Then when a little hard going hits them, how practical they become! Any phoney or pseudo breadth of vision is focused to a bright, clear spot and out the window go all the thinkers of great thoughts.

All of this preamble, because a gentleman asked our help in building up a fodder yeast business. He had sugar cane and molasses in abundance. He wanted to convert it to a more salable form, e.g. yeast for cattle food.

But despite the New Deal theories of agriculture, the laws of thermodynamics persist, so we are informed by those who have not forgotten all they learned in school. When yeast grows it consumes 90 per cent or more of the available carbohydrates and builds into its body substance only about 75 per cent of the available protein.

Hence conversion of sugar or molasses into yeast loses 90 per cent of the carbohydrate and 25 per cent of the protein.

It does not look like the basis of a sound business.

Freezing Gone Haywire

WHO is this Willard person from Hollywood who freezes monkeys solid for the fun of it? What kind of a "doctor" is he? And on what basis does he assume that freezing a tubercular animal will cure its tuberculosis, or will destroy T.B. organ-

isms in its body or anywhere else for that matter?

What a boon to the meat-packing industry it would be if carcasses or viscera, condemned because of tubercular infection, could be made safe and wholesome merely by the simple process of freezing!

And as for the possibility of freezing living animals and resuscitating them after a long period of time has elapsed, evidently this "scientist" has failed to read the literature of freezing or he would know about the time factor involved in the phenomenon of irreversible dehydration of colloids frozen at low temperatures. Those who have had any experience with frozen meats know about this phenomenon from the dripping that invariably occurs during thawing after prolonged storage.

And as for the alleged film writer who proposes to permit himself to be frozen for the benefit of science, we believe that a little dehydration would do him a great deal of good.

To Stimulate Flour Consumption

Carbohydrate competition is constantly intensified. Flour, bread, macaroni, and potato groups have all lately been struggling with the question—"Why do we not sell more per capita?"

Latest in the lists for a larger part of the consumer food interest is Millers' National Federation. It recently voted unanimously to undertake a campaign for increased flour consumption. It plans to use the skill of home economists, industry research men, a variety of promotion media, and an extensive campaign of cooperation with the principal industrial customers of the industry, the bakers.

For three or four decades, flour consumption has been declining in the United States. Other forms of carbohydrate food have been substituted, largely the carbohydrate found in milk, fruit and vegetables. The millers believe that this trend can and should be arrested by making the breadstuffs and pastry of the nation more attractive. They now propose to do something about it, definitely and constructively.

Perhaps the greatest hurdle that the industry will have to surmount is the trend toward fresh vegetables and salads which, as FOOD INDUSTRIES has frequently pointed out before, now constitute so much more than formerly the bulk items of the average diet. So long as Mr. and Mrs. America and the little Americas distend their middles twice daily with vegetables, there is much less desire to use bread as the stuffing medium.

It happens that confectioners and others who disburse concentrated forms of carbohydrate have ridden on the crest of this wave to enlarged sales per capita. Apparently there has been thus an attainment of increased markets without conscious effort. The new dietetic habits of America, substituting vegetables and salads for bread as the bulk item formerly typical of the diet, definitely decreased carbohydrate consumption in bulk. This increased the carbohydrate hunger, which could be satisfied most conveniently and pleasantly for both adult and youthful America by candy and other sweets, including ice cream and the milk desserts. Only a part of the necessary carbohydrate replacement came in the fruit, vegetables and milk.

It is going to be very interesting to see how the millers can solve this difficult and complicated problem. They are determined to recapture a larger share of the food dollar, and perhaps will be able to do so. Every division of the food business will—must—watch, because each is affected, whether he knows it or not. Readjustments in dietary habits, no matter how brought about, affect all parts of the diet, hence every division of the industry.

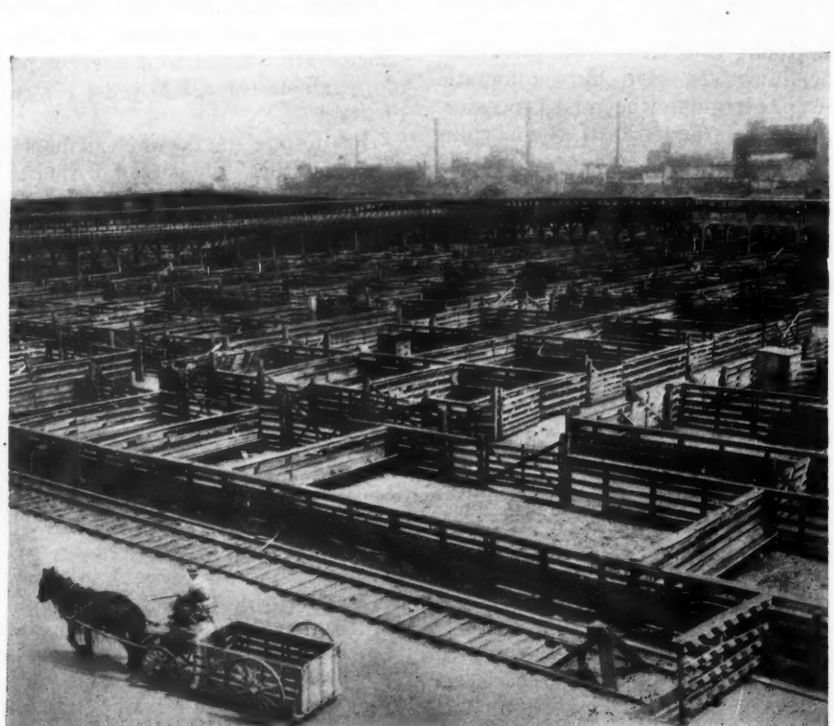


Photo by Wide World

Empty pens at the Chicago Stock Yards testify to the shortage of animals which has put meat prices so high that consumers are refusing to buy. Hog handlers number only 200 today compared with 800 a year ago.

Revolutionary Packages

ALTHOUGH it is not yet ready to be offered to food manufacturers, we have seen an amazing experimental package of milk consisting of a hermetically-sealed, liquid-tight transparent bag inside of an ordinary carton perforated with slots to show the cream line. Its basis, a very recent discovery of a method of sealing transparent waterproof wrapping material while it is submerged beneath a liquid food, is one of those inventions that may cause revolutionary changes in many forms of packaging of liquid or wet material—and premature gray hair.

New Developments in Vitamins

IN 1928 and 1929, a large sector of that part of the world known as the United States was more or less wild about quick freezing. Now it is all excited about vitamins. Pure crystalline vitamin B is on the market. Two concerns are now making pure vitamin C, one the natural, the other the synthetic vitamin.

Several requests have come to this office for commercial sources of pure vitamin A, other than the one commercial source now known. (Evidently some do not care for the color of carotene.) Highly potent mixtures of vitamin A with a little vitamin D are available in relatively large quan-

Excessive Profits Demanded by Law

A PROCESSING TAX is a demand upon manufacturers to make more money. Yet as far as we know, there are no food processers or business men in any field that are not doing their level best to make all the money they can. And, for the most part, the pickings are rather slim.

Nevertheless the government of the United States says, in effect: "You must make *more* money, and give the extra amount to us." On top of that, the government uses the tax to make it more difficult to produce the excess profit demandad by curtailing the volume and forcing prices to higher levels.

The truth about processing taxes is gradually dawning on the American business man. Some day this truth will penetrate even the minds of the brilliant economists in Washington.

tities. One of them is a curiosity. It runs around 400,000 units of vitamin A with about 10,000 units of vitamin D per gram which, in a manner of speaking, is some potency.

When it comes to the natural fish liver oils, all manner of combinations are available. One runs 40,000 units of D with around 150,000 units of A. Another oil is available in commercial quantities that runs between 15,000 and 20,000 units of D and has 225,000 units of A per gram. Also there is a natural oil that runs 25,000 units of vitamin D, with practically no A.

Vitamin D is now available in a variety of ways and is the most highly commercialized development in this group. If abundant supplies of vitamins are the key to greatly improved public health, the world will soon be taken care of.

And Now—Vitamin K

THE list of vitamins—so-called, as well as real and hypothetical—is now extended down the alphabet to the letter K by the discoveries of Professor Dam of the University of Copenhagen.

Up to now, Vitamin K was regarded as antihemorrhagic for chickens, i.e., its absence from the diet causes the chick's blood to be extremely slow in clotting. This new vitamin has been found in hog liver fat, in hemp seed, tomatoes and kale. It is also found in a limited amount in certain cereals.

But try as much as one will, it is difficult to figure out how sales departments are going to be able to capitalize a vitamin of this property.

Gas Storage, Threat to Canners

GAS STORAGE of foods is more highly developed in England than in any other country. A recent statement by the Department of Scientific and Industrial Research shows that the apple known in England as Bramley's Seedling—a variety that heretofore has been more difficult to store than many other varieties—can be kept in excellent commercial condition for a whole year!

At a temperature of 41 deg. F., in an atmosphere of 10 per cent oxygen and 10 per cent carbon dioxide, this astonishing achievement is made a possibility.

Were gas storage applicable only to apples, it would not be a serious threat to other forms of food preservation. However, there are ample indications that gas storage soon will be commercially applied to pears, tomatoes and other perishables. In the storage of fresh meats under controlled atmospheres, the English are also pioneers. America can learn a great deal from English practice, but also American industries must be alert to the impending competitive methods of preservation.

Before Changing Packaging Methods—

A PACKAGING problem arises occasionally that is well for all to understand perfectly, for failure to comprehend its importance may result in delays in production, financial losses and unpleasant, as well as wholly unwarranted, recriminations.

Any packaging material possesses many intrinsic qualities which are responsible for its choice for application to any given package. Not the least of these is its strength—just plain ordinary tensile strength. But often this factor is overlooked when making changes in packaging operations or replacing old machines with new ones.

As a rule, the higher the speed of a wrapping machine, the greater the need for higher tensile strength of the wrapping material. There are two concerns in one city that use the same material for wrapping, but one of them must have a heavier paper because its machines run faster. If these factories should interchange their wrapping materials, one would have all kinds of mechanical troubles while the other would be using a material far too heavy.

Similarly there is a concern which used a special wrapping paper for a decade with very evident satisfaction as long as the operations were entirely manual. But when new machines made it possible to wrap the irregularly shaped package mechanically, the old paper was a failure and the supplier was erroneously and wholly unjustly criticized for selling defective paper. As a matter of fact the paper was identical with all previous shipments, but it was not strong enough for mechanical operations which had been introduced without warning the paper maker.

It is a safe rule always to consult the packaging material manufacturer before changing methods or machines. It may save considerable embarrassment.

Starch Can Be Sterile

HAPHAZARD or "guessometric" analysis has no place in trouble-shooting—or anywhere else. If spoilage problems arise in the food plant, it is imperative that the source of infection shall be run down in a systematic manner. In occasional instances, the principal source of bacterial infection has been found to be starch which is used as an ingredient or comes into contact with many foods, most of which are not sterilized by subsequent heat treatment. Therefore, it can be a potential source of bacterial infection, just as every other raw food ingredient, even yeast, can carry foreign organisms.

The mere fact that starch is a dry substance does not necessarily insure its sterility, for some manufactured dry substances have been known to carry as much as a half-million bacteria per gram. This, however, is rare.

Important to realize is the fact that powdered starch can be made sterile and can be purchased in sterile condition. Any starch-maker can supply sterile starch at but small extra cost and frequently cases will arise where it should be purchased in this condition.

A Class of Factory Problems Never Met in the Laboratory

Pipe Line Contaminations

And How to Avoid Them

By HALDANE GEE
New York, N. Y.

PRODUCTION superintendents in the food field outside of milk plants have learned in recent years to beware of pipelines. They are inclined to regard any complicated system of pumps, valves and piping as a weak spot in the plant's sanitary defenses. The aversion is not without reason. There have been numerous instances of bacterial contamination which have defied all ordinary sterilization measures, but which were finally traced to apparently invulnerable foci of infection in pipelines. Distributing systems have on occasion been taken down, cleaned and reassembled in an effort to end such trouble, a procedure sometimes affording temporary, but seldom permanent relief.

Out of this experience has evolved the general rule that aseptic conditions cannot be maintained in the food plant by the simple sterilization means given in the college textbooks on bacteriology. Steam at 15 lb. pressure may kill everything in a culture flask in a laboratory autoclave within twenty minutes. The same treatment, however, means little in a circuitous layout of opaque piping. Such installations, moreover, are seldom designed for high-pressure steam sterilization.

Pipelines are nevertheless finding increasing use for the transport of raw and finished food materials. Satisfactory explanations have been forthcoming for some of the earlier difficulties, and sanitation measures have been put on a rational basis. Some of the tricks are no longer secrets among plant operators who have made extensive use of piping. New technics have been introduced in recent months.

Engineering design has been found of primary importance. A complete change of both general layout and details may be advisable when a food plant encounters trouble from infection. Bactericidal agents are not of avail unless mechanical cleanliness can also be secured and maintained. Danger therefore lurks in all traps, pockets and recesses where residual material may accumulate. Many such trouble spots can be eliminated by the proper choice of pumps, valves and fittings. Where crevices cannot be eliminated from the system, there must be provision for easy and certain removal of material which would otherwise accumulate in them.

SOME factories refuse to countenance any permanent pipe installations, insisting that all such equipment be taken down at the end of the day's or season's run. There are, however, "permanent" lines in successful and trouble-free operation. The recent introduction of glass piping in the food field is a development which has simplified the construction of safe, permanent systems.

So-called "sanitary" equipment is common for the handling of fresh milk. It is a legal requirement in most localities, with the time and manner of cleaning usually covered by regulations. "Sanitary" lines are usually of metal, coupled in short lengths by bayonet or fast-thread joints. Brushing is an essential part of the cleaning operation, with special machines designed for the purpose. Sanitary stopcocks are employed in conjunction with the takedown dairy equipment. Barrels of the cocks are removable, and there are no shoulders which would hinder easy brushing of the fitting.

Although intended primarily for fresh milk, the sanitary dairy equipment is convenient for other liquid food products. A national canning company having catsup among its products has adopted the policy of assembling ordinary pipe and fittings for the tomato season and then removing the lines. But the interchangeable, quick-coupled milk units would be ideal for this type of service.

Conventional "sanitary" equipment, on the other hand, does not meet all requirements of the dairy industry itself. It aids the maintenance of a low bacterial count in fresh milk by minimizing contamination. The processing of milk products, however, calls for positive measures, which usually involve liquid-tight lines protected against air contamination and supposedly arranged for periodic as well as effective sterilization. Nevertheless permanent lines are often employed in dairy products manufacture and they have been known to cause trouble.

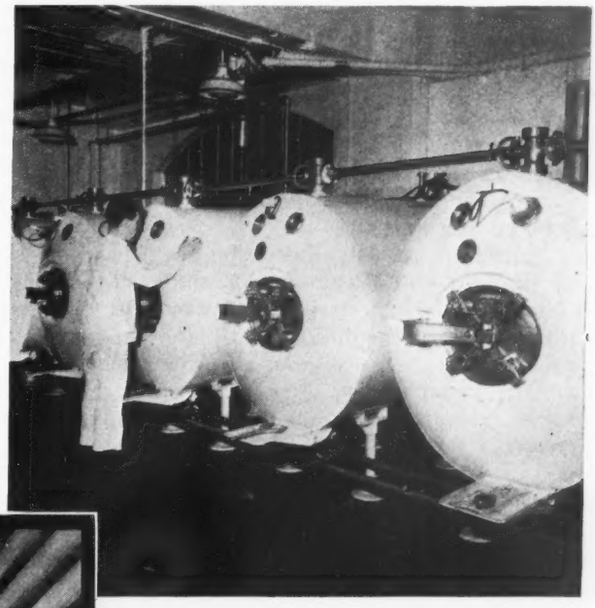
A large dairy company encountered difficulty of this kind several years ago in an Ohio plant making powdered milk. The finished product was showing the unsatisfactorily high bacterial count of 500,000 per gram. Palliative treatment, a routine clean-up, failed to reduce the count, and more radical measures were applied. Every pipe and pump assembly in the place was taken apart, scrubbed and given a prolonged sterilization in the processing retorts. Pipes too long to go inside the autoclaves were cut in pieces and fitted with unions. The pipe connections were made in

straight lines when the equipment was reassembled, eliminating former tortuous detours around the plant. When the process was again put into operation, the product came through with the gratifyingly low count of 400 per gram.

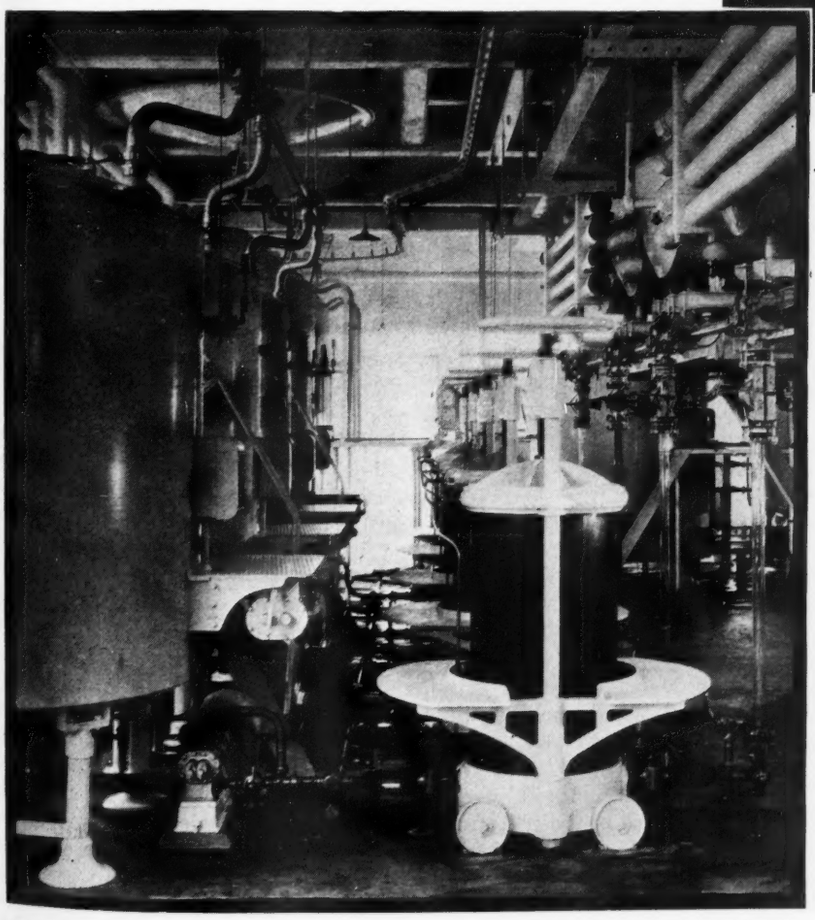
OUTSIDE the food field, but nevertheless instructive, was the experience about a decade ago of a large Mid-West fermentation plant which was brought to a virtual standstill by contamination difficulties. Operating a bacterial process in a closed system, the plant was a maze of steam, water, mash and inoculant lines. The equipment was essentially chemical, and the pipeline system was a masterpiece of steam fitting. There were batteries of cookers, coolers, culture tanks of several sizes for inoculant, and gangs of pumps and fermentation tanks. All these units could be connected in almost any combination by opening or closing the proper valves. There was a multiplicity of cutoffs and bypasses, and the valves were of either the gate or globe type.

Once gaining a foothold, the contaminating organisms defied control for months. Lines were supposedly sterilized with steam, and precautions had always been taken to avoid air contamination around glands, gas vents and sample cocks. The infection was so persistent and mysterious that some of the numerous experts called in entertained the possibility that bacterial variation was responsible. The hygienic measures attempted at that time did not, however, include unshipping the elaborate piping system, which had operated undisturbed for years. Present-day diagnosis would have indicated redesign and simplification as the remedy.

THE foregoing and similar experiences have compelled renewed recognition in the food and fermentation fields of principles of sanitation long regarded as fundamental in brewing. Old-time breweries did not strive for complete asepsis, nor did they insist on pure-culture fermentation. But they were aware of elementary points of hygiene whose neglect will be the undoing of any "modern" scheme of sterilization. Brewers are familiar, for example, with the sanitary cock, essentially a large bronze stopcock constructed for easy cleaning. Although in some ways an antique, the stopcock has proven a fitting of desirable simplicity for handling foods. A well-seated cock is virtually leak-proof, and it eliminates the troublesome pockets and shoulders of a globe or gate valve. Specifications of a leading yeast company now rule out valves in favor of cocks. Similar considerations apply to pumps, with the brewer's or dairyman's sanitary centrifugal pump available for a variety of food purposes. The impeller can be reached for cleaning by removing a plate.



Left: Installation of sanitary "take-down" pipe at New York plant of Dairymen's League Cooperative Association, Inc. Dairy plants wash out pipes with a brush as part of daily routine cleanup.



Glass piping and sanitary fittings simplify sanitary inspection at Hoffman Beverage Co. plant. Cooler tubes are sterling silver, with silver-plated bronze return bends.

Apart from the style of pumps and fittings is the problem of "dead ends," *a sterilization difficulty peculiar to the plant and unknown in the laboratory.* A line temporarily unused, or one through which there is no positive circulation, may be responsible for this form of grief. A single thermometer or steam gage does not re-

veal conditions throughout a line, nor does it indicate that a heat treatment effective at one spot has also reached remote parts of the system. In heat-treating ramified equipment, care must be taken that every part of the equipment reaches sterilizing temperature before starting to measure the elapsed time of the treatment.

Units cut out of a system by a valve can be a source of trouble. A striking example of the latter danger was the experience of a European paper mill disorganized by bacterial infection. An apparently close check of the equipment did not reveal any weak spots. It was later discovered that an abandoned line, cut off from the working equipment by a valve and forgotten for years, was responsible for regular reinfection of the mains between sterilizations.

Reliable in the laboratory, the use of high-pressure steam is not considered good plant sterilization practice in view of the difficulty of engineering "dead ends" out of the system completely. *Superheated water is the preferred agent for heat treatment.*

OUTSTANDING among recent food piping installations is that in the plant of the Hoffman Beverage Co., Newark, N. J., where elaborate and successful use has been made of Pyrex glass tubing. Sanitation measures are so thorough in this factory that no need has been encountered for either pasteurization or ultra-filtration of the various beverages handled.

The glass pipe lines, of 2-in. size, are permanent. They carry syrups, fruit juices and process water. The advantages of transparency was felt to outweigh the possibility of breakage in use when selecting the pipe material, and subsequent experience has justified discounting the fragility factor. The assembling was handled by the company's own mechanics, who were well-skilled but were without previous experience with glass pipe.

Fittings were deliberately reduced to the minimum number. Short elbows were avoided in favor of a long-sweep bend wherever possible, a rule which frequently called for a special fitting in place of the less expensive standard part. A standard T-piece was on occasion eliminated in favor of a special T-connection fused on a 6-ft. length of pipe, thereby eliminating two joints.

Special attention was paid to coupling gaskets. In standard form, these were objectionable because the inside diameter of the gasket is greater than that of the pipe, leaving a pocket at the joints. Hoffman used carefully cut gaskets of live rubber which provide a smooth and continuous bore at the joint.

A selective tank-discharge unit was installed which guaranteed sanitation and was also a model of simplicity. It is necessary at one point in the plant to transfer the contents of mixing tanks into any one of five distributing pipe lines on the floor below. The easy fixture from the standpoint of operation would be a manifold with five taps and valves, all permanently in place. As finally worked out, however, the switching point used no valves at all. The transfer pipe was provided with a flexible, removable rubber joint which could be easily sterilized. Connections to the distributing system were arranged radially about this point. A short piece of glass pipe ending in an elbow is used to divert the main-line liquid wherever required.

Stoneware cocks, after trial of other types and materials, were adopted as the standard form of shut-off, these being coupled direct to the glass lines. Numerous fittings were eliminated by the use of two-way and three-way cocks, an advantage inherent in the historic stopcock but not available in any form of gate valve. A single three-way cock between the supply line and a mixing tank provides for all possible switches of liquid, a requirement for which three single open-and-shut valves would be necessary.

The Hoffman piping system is left permanently in place save at two points, of which one is the five-way distributing unit, assembled each time it is used. The other point, where mechanical cleaning may be occasioned, is at one of the circulating pumps. Circulation is maintained primarily by gravity flow, a factor which influenced the layout of the plant. Where pumps could not be avoided they were special jobs. Centrifugal pumps with a cleanout panel have proven trouble-free. Their one possible weakness, the packing gland, is equipped with a built-in steam line and is periodically sterilized.

CLOSE attention is paid to general sanitation at the Hoffman plant. Tiled walls and polished or enameled equipment minimize dust. Floors are never allowed to become littered. Attention to detail has been so thorough that the tank-supporting equipment is special. The hollow legs have been drilled at the top and grooved at the bottom that they may be washed out and sterilized periodically.

Procedures in the Hoffman plant are undoubtedly instructive for all pipeline operators. Adequate evidence of their efficiency is the fact that spoilage and fermentation are not encountered in the company's products despite the fact that the bottled goods may be held for several weeks in a warehouse, and for a similar time in the stores of distributors. Whether the routine would suffice for products usually held for longer periods, as wine, is not certain. The Hoffman factory, however, holds samples for a year after manufacture, a much longer time than ordinarily occurs between production and consumption of its products, but growth of micro-organisms has not been encountered during this long period. Tracing of possible trouble is simplified by a complete coding system which reveals the past history of any bottle or batch turned out by the plant.

Having assured mechanical cleanliness from the beginning, the Hoffman plant has had no difficulty with sterilizing agents. All water subsequently entering beverages receives both ozone and ultra-violet treatment. Equipment which will take steam pressure receives treatment at 10 lb. Scalding water is the first rinse given the pipe lines, followed by a standard sterilizing liquid. Time and concentration of sterilization treatment is varied as experience dictates, without reliance on any single routine as invariably efficacious.

Peculiar to glass among pipeline materials is its advantage of reduced skin friction, a factor of greater importance from the standpoint of clogging than from the possible one of saving of power. The effect is illustrated by the handling of mustard, a product which is inclined to clog in a metal tube. Glass nipples were found to deliver clean on a machine for filling mustard bottles. Possible chipping of the end of the tubing was an offsetting feature for this use, however.

Among novel applications of pipe conveyors in the food plant is the transport of shortening, a product with which trouble might be expected. Procter & Gamble Co. has successfully used iron pipelines for this material for some years. A recent change in this company's installations is the adoption of welded joints which eliminate recesses at couplings.

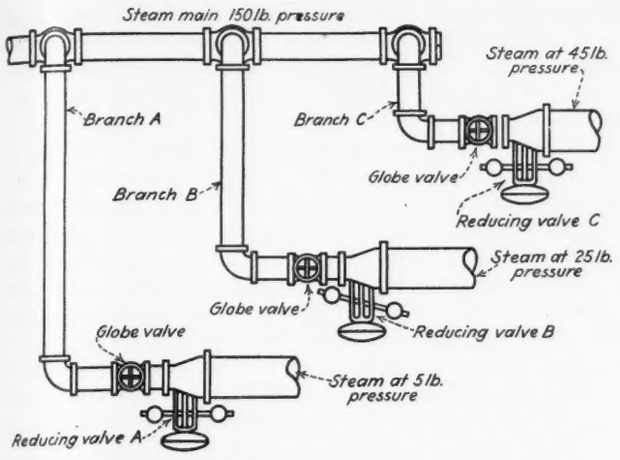


Fig. 1: The reducing-valve system commonly employed to obtain steam at various pressures from a high-pressure source.

Purchase? Or Generate?

Relation between the steam and power demand determines whether by-product power can be made economically from the boiler load

By OTTOMAR H. HENSCHEL
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MOST food manufacturers, because of the nature of their power requirements, find themselves faced with this question: "Which is the least expensive, purchased or plant-generated electrical energy?" If the manufacturer happens to have but little demand for low-pressure steam for processing and space heating, then the answer is "no," despite the comparatively high rates of the power companies.

Given a demand for low-pressure steam, economical generation of electricity in the plant depends upon whether the boilers will handle the pressure required to drive the generators and whether there is a close relation between the steam requirements of the generator and of the processing or heating loads.

As to steam pressure, the possibility of generating electricity is precluded unless the boilers will handle at least 125 lb. per sq.in. If the boilers are able to produce the high-pressure steam, fuel costs for the higher pressure will not be much higher than for low pressure, in spite of the common belief to the contrary. At a gage pressure of 25 lb. per sq.in., a pound of steam contains approximately 1,169 heat units (B.t.u.), while the same pound of steam at 150 lb. pressure has a heat content of 1,195 heat units. This is an increase of less than 3 per cent. Obviously, from a theoretical standpoint, this would indicate an additional fuel requirement of 3 per cent. In practice, there may be practically no difference in fuel consumption at the higher pressure; and where the boiler originally was designed to operate at 125 or 150 lb. pressure, the fuel consumption may be even less because of the higher efficiency at the higher pressure.

Take, for example, a boiler so designed that it will evaporate 10.4 lb. of water per pound of coal at a pressure of 125 lb., but which will evaporate no more than 8.0 lb. of water when the pressure is reduced to 30 lb. At the higher pressure, 20,800 lb. of steam can be generated for each ton of coal consumed, while at the lower pressure a ton will produce only 16,000 lb. of steam. Assuming a coal cost of $5 a ton, the high-pressure steam will cost approximately $0.24 per 1,000 lb. and that generated at the low pressure, $0.312. From this it is evident that going to a higher pressure may be economical and that reducing the pressure, as many plants do when they have no demand for anything but process steam, is by no means always a sound practice.

IF high pressure steam be available, then the next step in weighing purchased against plant-generated electricity is to analyze what happens when steam is used for processing only and then when it generates power as a by-product. Fig. 1 illustrates a commonly employed piping arrangement for supplying processing or heating steam at various pressures from a high-pressure source. In the supply line the pressure is 150 lb., while that in line A, which serves a heating system is 5 lb. and that in lines B and C, which serve processes, 25 and 45 lb., respectively, the required pressure reductions being obtained through reducing valves. The rates of flow may be assumed as follows: line A, 6,000 lb. per hour; line B, 4,500 lb. per hour; line C, 1,500 lb. per hour. This gives a total of 12,000 lb. an hour through the main line. Assuming that the boiler has a rate of 10.4 lb. of water per pound of coal, with coal at $5 a ton, as in the case above, the fuel cost of the steam will amount to $0.24 per 1,000 lb. This makes the steam supplied to this system cost $2.88 an hour.

But instead of employing this arrangement, a steam turbine may be substituted for reducing valve A. Since an exhaust delivery of 6,000 lb. of steam an hour is required for heating, about 6,600 lb. (6,000 + 10 per cent) must be supplied to the generating unit at a pressure of 150 lb. If this be a unit requiring slightly more than 60 lb. of steam per kilowatt hour, then 100 kw. of electrical energy will be generated. Thus, it is possible to obtain this 100 kw. for each hour the steam requirements amount to 6,000 lb. with but 600 lb. more of steam, which makes the electrical energy more or less of a by-product. By calculation, the cost of the energy, as far as steam alone is concerned, would amount to only $0.24 $\times$ 0.6, or $0.144, which would be at a rate of $0.00144 per kw.-hr. Adding $0.004 for fixed and operating charges for the generating equipment required and to cover a heating period of five months, the energy would be obtained at a net cost of $0.00544, or less, per kw.-hr., a rate decidedly less than that charged by any existing utility.

Going a step farther, the 25- and 45-lb. pressure services could also be eliminated by the installation of the

so-called bleeder type of turbine, and it is interesting to determine the approximate amount of energy available under such a scheme, assuming an 8-hour working day, a five-month heating season, and a 300-day process load.

DURING a portion of the Fall and Spring months, and all of the Winter months, a delivery of 12,000 lb. of steam would be required, as previously explained. With a generating-unit steam requirement of 60 lb. per kw.-hr. about 200 kw. could be carried. During hours of plant operation (1,000 for the five-month period) this would provide 200,000 kw.-hr., with an added steam demand of 1,200,000 lb., which, with a fuel cost of $0.24 per 1,000 lb. of steam, would cost about $288.00. For the remaining seven months (1,400 hours of plant operation), when only process steam is required, there would be available 140,000 kw.-hr. of electric energy by the added consumption of 840,000 lb. of steam costing $201.60.

Because of the larger equipment that may have to be installed to care for the larger demand, the fixed and operating charges will be higher with these systems where power is generated as a by-product. Conservatively speaking, $0.007 per kw.-hr. will cover these added charges, making the net cost of the by-product power $0.00844 per kw.-hr., or less.

When the demand for heating and process steam approaches fair proportions, as with the system just discussed, plant-generated electricity tends to become economical. Especially is this true when the steam and electric loads of the plant approach an in-phase condition—that is, when they rise and fall in unison. And the economy becomes still greater with a close relation between the steam requirements of the generating unit and the heating and process loads. Unless either or both of the latter conditions prevail, by-product power may be excessively expensive.

To illustrate how to analyze and interpret these factors, two cases may be considered. Both cases, A and B, are graphically represented in Fig. 2. Case A represents a typical industrial plant with a daytime electric load. Alongside the curve depicting the electrical load are two others, one picturing the apparent steam requirements of the generator supplying the electricity and the other showing the heating and process steam demands. The heating and process steam load rises slowly throughout the forenoon, becomes constant between 11 a.m. and 12 noon, and then climbs to a decided peak in the afternoon.

Until about 11:30 a.m., the apparent steam requirements of the generating unit exceed the heating and process steam demands, and during this period much exhaust steam is wasted into the atmosphere. After 11:30, however, the apparent steam requirements of the generating unit drop considerably below the heating and process steam demands, indicating full extraction of electric energy from the available steam supply. During this period, live steam from the boilers makes up the heating and process steam demands. With these conditions of plant operation, a large proportion of electrical energy requirements during the forenoon are generated at comparatively high cost, the cost, no doubt, being greatly in excess of that which would prevail were a portion of the forenoon's electrical requirements purchased.

Should this condition continue daily, operation in conjunction with a public utility might prove advantageous. The generating unit in the plant could be operated in parallel with the power company's lines.

CASE B illustrates another condition. Here the apparent steam requirements of the generating equipment are less than the heating and process steam demands at all times except at 10 a.m., illustrating full utilization of steam with the addition of some live steam to the heating and process systems. In this case, generation of all the electric energy needed in the plant would, undoubtedly, prove the most economical.

The food plant executive who wants to know whether to generate electricity locally, and how much to generate, should make a thorough study of both electric and steam demands for every hour and season.

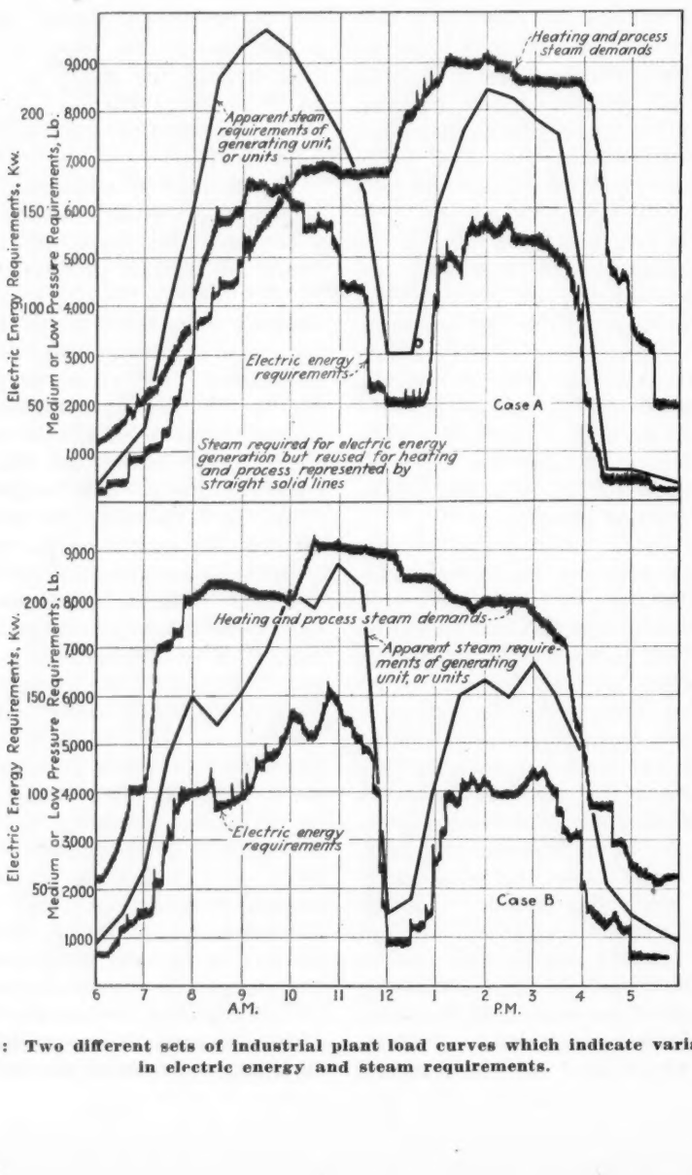
Heating and process steam demands
Apparent steam requirements of generating unit, or units
Electric energy requirements
Case A
Steam required for electric energy generation but reused for heating and process represented by straight solid lines
Electric Energy Requirements, Kw.
Medium or Low Pressure Requirements, Lb.
Heating and process steam demands
Apparent steam requirements of generating unit, or units
Electric energy requirements
Case B
A.M.
P.M.

Fig. 2: Two different sets of industrial plant load curves which indicate variations in electric energy and steam requirements.

The butchered tuna are cooked in the wire baskets seen in the rack in the middle of the room. After cooking these women skin and bone out the loins. The operation is known as cleaning.

Replacing Natural Oil

The natural oil of the tuna must be removed and replaced by a better tasting oil to make a fine-flavored product

By JULIUS E. LINDE

President, Seaboard Packing Corp., Long Beach, Calif.

ALTHOUGH the operations of packing tuna are relatively simple, there is involved considerable science and art in the preparation of the fish, for the fresh meat of the tuna as it comes from the sea has a peculiar flavor that must be removed by prolonged cooking in order to make the fish palatable. Unless the fish is factory-processed it is not popular. For that reason, tuna will probably never be known to the people of the United States in any form other than canned tuna, and in this respect the tuna differs from nearly all other fish.

The undesirable flavor of the raw fish is in the fat and this can be cooked out by prolonged steaming. This is done by placing the thoroughly washed, gutted fish in galvanized wire baskets, 16x36x4 in., and in turn placing twelve baskets in a rack and rolling the racks into pressure cookers. Here they are subjected to live steam at 15-lb. per sq.in. pressure for a period of hours running from 2½ hours for the smallest fish to 7 hours for the larger fish. During this period the oil runs out of the fish, collects in the bottom of the cooker and is later disposed of as by-product oil.

CATCHING the tuna fish is done with hook and line at sea, and contrary to the practice of the fishermen of the North Atlantic Coast, where the fish are cleaned at sea, the tuna are immediately packed in crushed ice in mechanically refrigerated holds in the boats. Here they remain until delivered to the cannery for cleaning on shore. After "butchering" the fish are successively washed, cooked, "cleaned" (boned and skinned), cut up, packed into cans and sterilized.

At the close of the cooking period, which is so essential to the proper preparation of the tuna meat, the racks are rolled out of the cooker to cool from twelve to 24 hours in a place where there is good circulation of air. In addition to the cooling another benefit is gained by the long wait: the flesh of the cooked fish becomes considerably firmer. The next step is what we call cleaning to distinguish it from butchering.

Cleaning refers to the removal of all skins and bones and when completed leaves the two sides of the boneless fish intact. In the tuna industry these two sides of the fish are called "loins" and are not to be confused with steaks or fillets, which are made by cutting slabs of meat from outside of the bony structure of the bodies of other types of fish. It is these tuna loins that are to be cut up subsequently and then packed into the cans.

Several loins, usually eight or ten, are placed in two parallel groups on wooden trays, 18x30 in., which pass on a conveyor under a knife that moves up and down in synchronism

with the conveyor, and cuts the loins to the desired lengths. (See photo.) By adjusting the width of the cuts, the machines can be made to cut the fish to fit any size of can in commercial use. The bulk of the pack is in ½-lb. tins, but quarters and 1-lb. cans are also packed. The width of the cut made by the machine corresponds to the height of the can minus the head space desired.

Naturally large fish are segregated and processed together: likewise are segregated separately the medium and the small fish at the time of butchering. By this method the loins are roughly all of a given size and this permits packing them into cans with a minimum amount of forcing and crushing of the meat. Another reason for segregating the several sizes of fish is to insure that all fish receive equivalent cooking in the steam jets, the largest fish receiving seven hours and the smallest only 2½ hours.

TRAYS of cut fish are temporarily stored in portable wooden cabinets holding 50 trays each. The cabinets are equipped with casters and are rolled about the plant to the packing tables, where women pack the cooked meat into cans, check-weigh them, and put them onto a conveyor. Next the cans are salted automatically and then salad oil is added.

Up to the point of adding the salad oil, the tuna fish flesh is quite dry, the natural body oil of the fish having been cooked out purposely in the second step of the processing. Were this oil-less meat to be eaten it would have a dry taste creating a sensation of something lacking. That something is fat. Hence the use of salad oil to replace that which has been cooked out. Prime winter pressed cottonseed oil is the grade always used.

After "oiling" the cans, they are ready for closing and sterilizing. Our plant uses vacuum closing machines. Next comes the removal of any oil or particles of the fish from the outside of the can by means of a special washing machine. If this step were omitted, the outsides of the can would be almost impossible to clean afterwards because of the protein material which would be cooked on. Sterilization is done at 242 deg. F. for periods from 75 minutes per ¼-lb. can up to 110 minutes for the largest.

The successful creation of this seafood delicacy depends on the removal of the natural tuna fish oil and replacing it with a bland vegetable oil.

FOUR species of tuna are canned commercially: Yellow Fin, the most important and furnishing the bulk of the pack; next, the Skipjack, a smaller species of more fragile texture; third, the Bluefin, a fine rich variety; and lastly, the Albacore, of which there is but little packed in the United States.

Inspection during operation is an important feature. Naturally, we have our own plant inspectors to supervise the quality very carefully. There is also a representative of the State Department of Health present at all times when packing is under way, and when we are operating on imported tuna, *i.e.*, fish from outside the territorial waters of the United States, an inspector of the Food and Drug Administration is present.

The cleaned loins are placed on wooden trays, passed through a vertical cutter to cut them to proper size to fit into the cans.

In this room the girls pack the cut loins into cans. A conveyor underneath the shelf in the middle of the packing table takes the filled cans to the salter, oiler, and vacuum closing machine.

Cross-Connections Dangerous

On the Plant Water Supply

By FERDINAND A. KORFF
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AN OUTBREAK of amoebic dysentery which resulted apparently from the pollution of the drinking-water supply in two hotels of a large midwestern city has served to focus attention of health officials upon types of plumbing arrangements which present potential hazards. It is well known that interconnections of polluted water supplies with those of a potable quality have been responsible for a number of outbreaks of typhoid fever.[1] Recent studies have shown that a somewhat similar situation may exist with certain types of plumbing fixtures and piping arrangements.[2] Such instances are termed cross-connections and may be defined as any system of piping or fixture construction whereby it is possible to contaminate the drinking-water supply.

Contrary to general opinion, cross-connections are possible in many piping arrangements as consideration of the principle of the siphon will show. A tube or pipe is bent to form two branches or legs of unequal length. The shorter leg is immersed in a liquid and when suction is applied to the longer leg, the liquid is drawn out through the longer leg and continues to flow as long as the short leg is immersed. Atmospheric pressure on the surface of the liquid continues to force the liquid up the short leg whereas the excess weight of the liquid in the long leg causes continuous flow.

Applying the principle of the siphon to plumbing fixtures the similarity will be readily understood. The riser, ultimately connected with the water main in the street, supplying water to the fixture forms the long leg of the siphon. Connections to fixtures form the short leg and may be difficult to discover at times. Siphonage will not occur merely by immerson of the short leg; the long leg must also be filled to produce the force sufficient to start the flow. By releasing the pressure normally existing in the long leg or rise, a flow in the opposite direction results causing the siphoning of the fixture contents into the water supply. Occurrences of such circumstances have been demonstrated on numerous occasions.

IN the food industry, particularly where large quantities of water are used, various types of cross-connections have been found. In some industries, can-washers, bottle-washers and soak-tanks have been found where the short leg of the siphon was below the level of the wash-water; the incoming water supply was below the level to which waste-water might rise if the drain should be closed deliberately or by accident. In other food plants auxiliary well-water supplies of doubtful origin are frequently used. Inlets of both potable water and that of the doubtful origin may be below the level of waste-water in a common tank. In restaurants and soda fountains automatic dishwashers are frequently constructed so that the water supply enters the bottom of the tank below the level of the water containing the rinsings of dishes and other utensils. The spray jet, used behind the soda fountain, is invariably a cross-connection since the water enters the bottom of small circular tanks or enamelled bowls. Clogging of the drain system and a diminution of pressure on the water supply may cause a return of rinse water into the water supply of the building. It may be stated that the water in such types of equipment is not actually contaminated; that usually hot soap solutions would be the only water entering the pure water supply. Although this may be true, the fact remains that such contamination, regardless of whether it is real or potential, should not be tolerated by food manufacturers whose product might be impaired by contaminated water. Installations of the character just described are discouraged by health officials because there is possibility of contamination of the pure water supply by sewage or other substances which may endanger the health of those who drink the water.

THE question may be asked: How can the present equipment used by the food-manufacturing and dispensing industry be corrected? There are on the market certain devices which, when installed on existing equipment, eliminate any possible contamination of the drinking-water supply. A rearrangement of certain small sections of piping in equipment may also eliminate cross-connections. It is suggested that representatives of the food industry request their local city or State Health departments to make surveys of their establishments in order to detect possible cross-connections and to recommend methods for their correction.

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Biscuit and Cracker Manufacture

Mechanized Through Necessity

By R. M. BOHN

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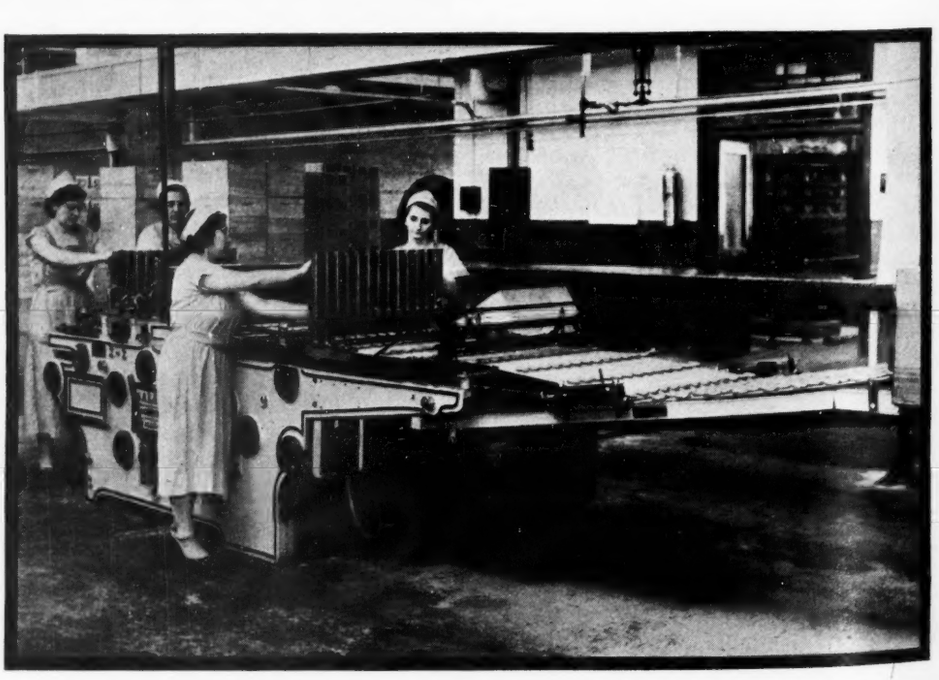
TO THE average person the making of biscuits and crackers is just another branch of baking. However, even a casual study of the industry reveals that it bears little relation to bread, cakes, and pies in equipment used, in methods of manufacture, and even in marketing.

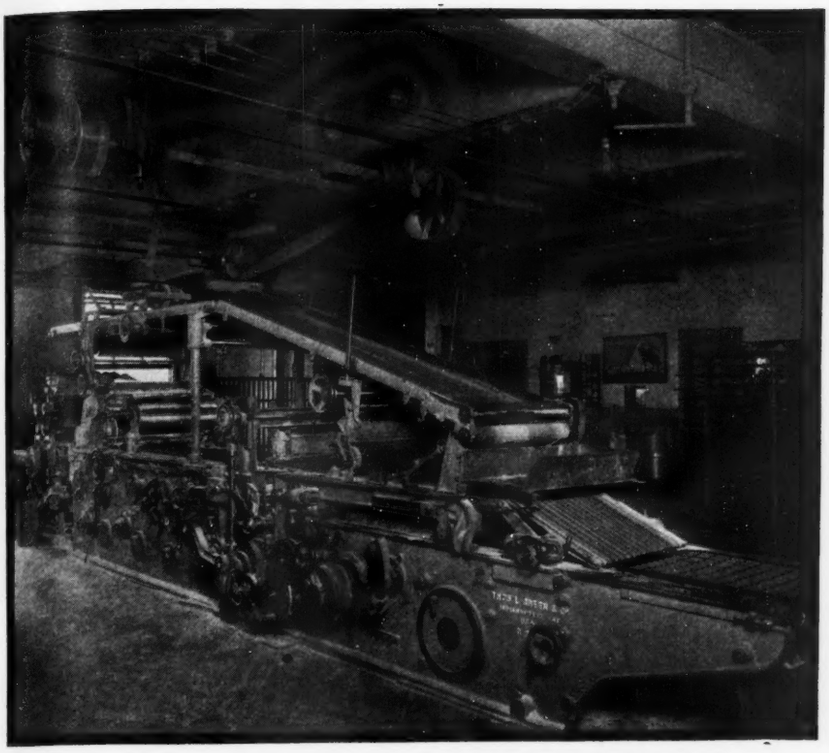
Biscuit and cracker manufacture is essentially one of machine production. These foods are relatively small in size and must be made on a volume scale; they are not readily made by hand-craft operations. In some instances a great variety of such products can be made on a single production line made up of standard machine units.

When we speak of biscuits the word is used in the English rather than the American sense. Such a biscuit bears no relation to our baking powder biscuits; it is a small, dry, close-grained cooky which stays palatable for months, or, in some cases,



Top-coated goods lend themselves to handling on an installation consisting of a series of conveyors over which at spaced intervals is a marshmallow or jelly depositor, a coconut topper, a cold air duct for setting marshmallow if piece is to be chocolate coated and finally an enrober or chocolate coating machine. A more impressive but lesser productive installation is that of the "trolley" system.

Sandwich style biscuit production on a volume basis involves the use of a unit consisting essentially of a bottom cooky feeder, a conveyor, a filling depositor, and a top cooky feeder.



Even in a small biscuit plant the cutting machine is relatively a huge and complicated unit. Particularly in plants having the steel band ovens it lends itself to an automatic hookup for the production of crackers and a wide variety of biscuits and snaps from stiff doughs.

even for years. The cracker is a product developed particularly in America, and differs from biscuits in that a vigorous yeast fermentation takes place in most instances. There are crackers, such as grahams, which are not yeast-leavened, but most of the products called crackers are fermented. Another difference is that crackers are usually baked directly on the oven shelves, while biscuits are baked on pans. The differences between the two are not absolute, as there is no sharp division; the two products overlap.

Biscuits and crackers can be classified either by formula, or by machines used in manufacture. The machine classification is the more important, and is stressed in this article; but a very simple description of the basic formulas is given. The proportion of ingredients are given as percentage of flour, as with bread or cake formulas.

A. "Sponge" goods are yeast-leavened. They contain up to 15 per cent of shortening and little or no sugar or other ingredient except flour. Sponge goods, as represented by the familar soda cracker, constitute about half the output of the industry.

B. Snaps, wafers, hard sweets, graham crackers, miscellaneous cookies of all sorts contain 30 to 50 per cent of sugar and 10 to 30 per cent shortening. Different dough consistencies, different machines, and formula variations make a large variety possible in this class. Eggs, milk and other enriching materials are commonly used.

C. "Honey" goods contain 40 per cent to 70 per cent sugar, honey, invert syrup, molasses or mixtures of these sugar products, and 0 to 10 per cent shortening.

D. Shortbreads contain 30 to 40 per cent sugar, and 30 to 50 per cent shortening.

E. Icing products are biscuits to which are added: (*a*) Flat icing, chiefly a simple water-sugar paste; (*b*) Marshmallow, a beaten up sugar syrup-gelatine confection; (*c*) Chocolate or coconut butter coatings; (*d*) Sandwich fillings, a beaten-up mixture of sugar and hardened coconut butter; (*e*) Soft marshmallow and icings or fruit jellies (trolley goods).

HOWEVER, in spite of the ingredient differences, the principal distinction between biscuits and crackers and other bakery products is mechanical.

Biscuits and crackers are baked in a very short space of time; from $2\frac{1}{2}$ to not over 7 or 8 minutes at an oven temperature ranging from 350 to 600 deg. F. The oven which has been standard equipment for at least 40 years is a twelve-shelf reel oven fired at the bottom by coal, gas or oil. This oven is much like a Ferris wheel in which the biscuits replace the passengers. The shelves, usually twelve in number, rotate in a brick housing in direct contact with the heated air and combustion gases rising from the oven furnace.

Crackers are placed directly on the oven shelves by a large peel—a broad, thin-bladed wooden paddle with a relatively short, well-tapered handle—while biscuits are dropped onto pans which are placed directly on the oven shelves. The biscuits are formed at a rate which permits them to bake in one revolution of the oven. Traveling ovens are coming into favor, however, and are being increasingly used. Three types are in common use.

1. Chain type in which pans of biscuits are carried through the oven on chain-belts. Gas is the usual fuel. No crackers or "peeled" goods may be made on this oven, but the better heat control and large capacity give them some advantage over reel ovens for certain purposes.

2. Automatic steel-band ovens are essentially an English development. This type consists of a very thin endless steel band traveling through a long gas-fired tunnel. The pieces of dough are dropped directly from the forming machine onto the band, which operation obviates the necessity for pans and manual loading and unloading of the oven. A simple attachment "stacks" the baked goods and reduces packing costs to a minimum. This oven handles everything except soda crackers. For biscuits it combines quality, large production and economy to a high degree. Crackers require that the formed sheets of dough be dropped directly on very hot metal sheets to get the characteristic "spring" and flakiness.

3. Smooth-hearth type traveler ovens are composed of heavy metal plates fastened to a chain in much the same manner as the tread of a caterpillar tractor. The plates come together to make a smooth hearth on the upper surface. They may be kept hot, which makes the baking of crackers possible. For biscuits, pans are used as with reel or chain ovens. This type of oven is characterized by high production and some saving in labor.

OTHER biscuit-making units, excluding the customary dough-mixing units, include:

Cutting machine equipment, which rolls a thin sheet of dough and stamps out the crackers or biscuits from the sheet. In the case of crackers, a sheet of stamped dough approximately 24x36 inches is transferred to the oven shelf by a large, thin, wooden peel. If biscuits are stamped out, they are automatically dropped on steel or wire pans which are placed in the oven while the trimmings are automatically returned to the sheeter. A modern cutting machine is a formidable affair which will just about fill a freight car. It makes crackers, hard sweets, snaps, and a wide variety of cakes from "hard" or stiff doughs.

The bar machine, which is usually an attachment to the cutting machine rather than a separate unit. It is essentially an extruding device somewhat similar to that used for making macaroni. Such products

as coconut bars are formed by extruding a ribbon of dough which is cut into short lengths, panned, and baked. This device also makes fig bars by extruding a continuous ribbon of fig jam inside of a tube of dough. The composite ribbons of dough and jam are baked in sections which equal the length of the pan and are cut into short pieces after baking.

Wire-cut and deposit machines, either of which deposits or drops small, uniform pieces of dough or batter in rows or pans. Both do the same type of work and can be considered together, although the wire-cut machine is the more flexible and more widely used of the two. Vanilla wafers and numerous types of soft cookies are made with the wire-cut machine. The dough or batter is extruded downward through a die, and the individual pieces of dough are cut off with a fine wire which moves across the face of the die. The pieces of dough drop directly onto pans. Wire-cut and deposit machines are relatively small in size as compared to cutting machines.

The Dutch cooky or rotary machine, which presses the dough into a die, the dough getting its form from the die in much the same manner as glass is molded or drop-forgings are made. The formed pieces of dough are dropped onto pans and baked. The rotary machine makes short-breads and semi-shortbreads and requires a dry, short, putty-like dough. In spite of a large capacity it is relatively small as compared to a cutting machine.

Sugar wafer shell units, which make the thin plain sheets somewhat in the manner of a waffle on continuous automatic machines. A thin layer of cream filling between two small pieces of the shell comprise the sugar wafer. The manufacture of sugar wafers is more or less of a specialty, and many biscuit and cracker manufacturers buy this item from firms which specialize in its production.

IN THE icing-room the equipment is peculiar to the five fundamentally different operations which are typical of biscuit manufacture. They may be identified on the basis of the type of icing or coating used.

A. Flat icings are the oldest but today perhaps the least important application of sugar products to biscuits. Flat icings are mixtures of sugar, glucose, invert syrup and gelatin, well beaten in upright beaters. The cookies are covered with the icing either by a special machine or by hand. In any but the largest plants, the sale of this type of goods does not usually justify a flat icing machine. This unit is so designated because it drops the cooky onto the flat icing where the cooky is left for a few seconds, then, lifted off, turned ice-side up and run onto a tray to let the icing dry. When the icing is dry, usually a matter of hours, the cooky is ready for packing.

B. Marshmallow is a whipped up sugar-gelatine mixture. A special machine deposits the marshmallow on the cookies. Then the marshmallow is covered with coconut to produce the "newsboy," an early icing piece. This product has been largely supplanted by enrobed marshmallow goods in recent years.

C. Enrober coatings consist primarily of sweet, bitter, or milk chocolate or a mixture of sugar and hard coconut butter which completely covers any biscuit, either plain or topped with marshmallow. An enrobing unit includes an enrober and an artificially cooled tunnel for rapid setting of the coating. In the enrober the cookies are fed by a canvas conveyor belt onto a woven wire conveyor through a falling cascade of the melted coating and a "shaker" or draining zone onto a glazed or highly polished surface conveyor from which they pass into the cooling tunnel counter-current to a flow of conditioned air which "sets" or freezes the coating.

D. Sandwich filling is a cream filling to be used between two cookies. It is a whipped up mixture of hardened coconut fat and sugar. There are two means of making sandwich pieces. The sandwich filling may be deposited on one cooky with the marshmallow depositor and the other cake placed on by hand, or they may be made up completely on a sandwich machine. Basically a sandwich machine is a stenciling unit. In it the cooky is pressed against a metal plate containing a hole which is slightly smaller than and is centered over the cooky. The filling from a hopper moving back and forth through a horizontal plane is pressed into the hole and against the cooky; the excess is scraped off. When the cooky is lowered, it carries the filling with it. To complete the sandwich another cooky is placed on the filling layer. Sandwich making is carried out in multiple units; from 5 to 15 pieces are made with each stroke of the machine.

E. Trolley goods are those produced on a trolley, a long, continuous chain from which are suspended several thousand hooks. Cookies are hung on the hooks. The chain moves slowly and continuously, and the cookies are dipped into and covered completely with one, two or three layers of marshmallow, jelly, or icing. Trolley pieces are among the finest biscuit and cracker products, but the trolley is a large and relatively expensive piece of equipment with a rather low production rate.

AS MIGHT be expected, the smallest biscuit and cracker plant is a one-oven unit. A complete one-oven plant will turn out approximately 15,000 pounds of baking and icing goods in an eight-hour day. The variety of pieces made by a biscuit plant is amazing to one unfamiliar with the industry. There are at least twenty fundamentally different types of cookies and crackers from the bakeshop floor and perhaps half as many more from the icing room; the possible minor variations and combinations run into the scores. Most biscuit and cracker plants market about 125 different items.

The auxiliary equipment, such as mixers, pans, and conveying equipment are also different from those used for bread and cake. Spindle mixers for crackers operate through a vertical plane, mix the dough in the trough in which it is fermented, and save considerable handling. Cookies of all sorts are mixed in a single-arm mixer of the horizontal type which has little or no gluten-developing action and which discharges its contents into troughs or the sheeter feed-hopper by tilting.

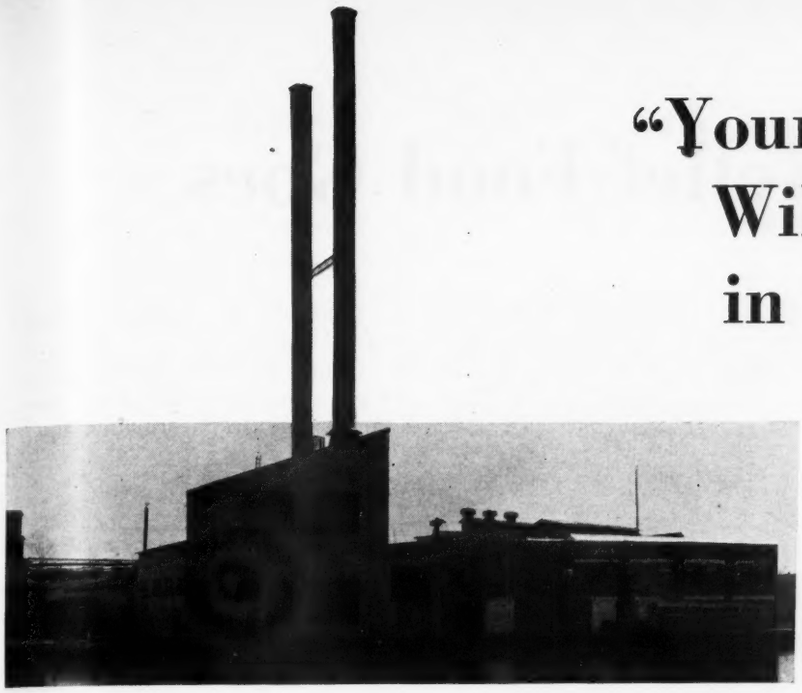
The raw materials are those used in the other baking industries. Three general types of flour are usually considered necessary for optimum manufacturing conditions. Cracker sponges require rather strong soft wheat flours. Soft flours of intermediate strength are used in cracker doughs and for a wide variety of cookies. Very weak soft flours are used in short-breads and certain other types of sweet goods, such as hard sweets, vanilla wafers, base cakes for marshmallow goods, and most soft-dough goods made on the wire-cut machines. The varying requirements and constantly changing flour characteristics combine to make flour a problem as it is in the other fields of baking.

Air-conditioning is finding increasing use in the manufacture of trolley goods and in other steps of manufacture where drying occurs. Without air-conditioning it is often necessary to make seasonal changes in formulas and manufacturing operations to offset unfavorable weather conditions. Some changes in formulas are also necessary, both in the bakeshop and icing room, to compensate for the effects of weather variations on the goods when in the dealers' or customers' hands where air conditioning is yet practically unknown.

Rancidity is perhaps more of a problem in biscuit manufacture than in the other fields of baking, because of the weeks or months of shelf life to which the goods are subjected. Both the manufacturers of shortening and of the biscuit themselves are working continually to learn more about this scourge and how to retard its development.

OTHER technical problems, some peculiar to the cracker and biscuit industry and some common to other fields of food manufacture, particularly to other phases of the baking industry, are so numerous that the large factors in the industry maintain their individual research and experimental plant facilities. These facilities require such a variety of experience and talent and such a capital outlay that the smaller factors in the industry have found cooperative action advisable. Without these facilities in one form or another, no factor in the industry would long be able to meet the changing demands of the consumer market.

"Your Water Supply Will Be Cut Off in 20 Minutes"



STORIES always differ as to what actually happens in an emergency. But in this case they all agreed on one point: a cloudburst at Bridgeton, N. J., on Aug. 3, 1934, was the cause of a storage dam being carried away; a few small ships tied up in the lower river were broken loose by the flood and carried away an important bridge; but, more important than all else, water mains were broken and the city, as well as its many food manufacturing establishments, were suddenly and without any warning deprived of their customary water supply.

One vivid tale has it that the first knowledge of the disaster in one big food plant occurred when the firemen telephoned the superintendent that he was pulling his fires, right in the midst of heavy production, because there was no more boiler feed water. It is said that things then began to happen with remarkable speed.

Whether this is the actual sequence of events or not, or whether the city water department notified the various canning plants of the emergency shutdown of all the water supply before the firemen began to be aware of the feed water shortage, are trivialities that are hardly worth investigation.

All of the plants and the entire population were up against a problem of the first magnitude. Goods were in process. Considerable quantities of perishable raw material were on hand. And more was on the way.

P. J. Ritter Co. had enough water on hand in storage tanks to finish the day's requirements for boiler feed water. And it was also fortunate enough to have several cooking tanks full of good, fresh water that enabled the goods in process to be finished.

E. Pritchard, Inc., had only 988 baskets of tomatoes in its yard and succeeded in running nearly all of them through the washers and pulpers before the wash-water gave out completely. And they were also fortunate enough to have enough boiler feed water on hand to boil the tomato juice to a very light pulp, can it in five-gallon cans, and set it aside before the boilers had to be shut down.

ALL of this happened in the forenoon. By afternoon the city engineers had succeeded in cutting off the broken water main and, although the storage dam and its reservoir of water were gone, they were able to pump directly from the river into the city main. Owing to the contaminated character of raw river water, it was necessary to chlorinate it very heavily. And this precluded its use in industrial cooking operations, although the water was reasonably satisfactory in quality for washing and boiler feed.

The quantity, however, was not all that could be desired. Pressure was very low. This was because of the necessity of rerouting the water through other mains via other parts of the town than those which had been cut off. The Ritter company was particularly fortunate in having four water mains from four different parts of town leading into its plant, a feature that is regarded as a most important precaution and safeguard against disasters of this character.

On the other hand, the Pritchard plant could not get enough water to continue operations satisfactorily. On Aug. 4, the next day, they had 497 baskets of tomatoes on hand that could not be diverted elsewhere, so they ran them into light pulp and closed down until Aug. 8. By that time water was available at about three-quarters of its usual pressure, and operations were then resumed.

At Ritter's, however, the situation was different. Their four water mains enabled them to get enough water for washing and boiler purposes, but they needed process water in a very pure state and in large quantities.

Hurried arrangements were made with Paul E. Kramme of Monroeville, N. J., who does all the Abbotts Dairies tank-truck hauling in that territory, to supply good spring water from a location 16 miles away. Here again Ritter had good luck, for there were enough extra tank trucks available in which to carry water to Bridgeton without disturbing the milk hauling service of Abbotts Dairies.

LOOKING backward with the perspective of a year, it does not look nearly as bad as it appeared at the time. But the incident is related to show that emergencies can and do arise from unexpected quarters.

Water mains have been known to burst. Wells have been known to go dry most unexpectedly, or have begun to pump sandy water that cannot be used. Well pumps at isolated plants have broken down, or power has failed. A water shortage can occur in any well-operated plant without much warning.

The important thing is to have a plant well-equipped for meeting emergencies, as was the Ritter plant, and well formulated plans with which to cope with the situation to save the goods in process before it is necessary to shut down completely.

Where Relief Food Goes

ACCORDING to Relief Administrator Harry L. Hopkins, 39,938,783 lb. of foodstuffs was shipped during the month of June by the Federal Surplus Relief Corporation to the 48 states, the Virgin Islands, and the District of Columbia for distribution to the needy by the Federal Emergency Relief Administration.

This supply brought the total up to more than 350,000,000 lb. shipped since Jan. 1, 1935; about one-third the total distributed to the same area and to Puerto Rico and Alaska between Oct. 1, 1933, and April 1, 1935.

These facts reflect a reason for the evident lack of market demand for many foods and should be taken into account by food manufacturers and distributors when estimating their potential markets. Thus far only a part of the food distributed to those on relief has come from commercial manufacture and processing. The major portion has come from surplus and as a result of salvage work that the Government has been doing to relieve drought, over-production, and general surplus conditions and to keep the cost of relief feeding to as low a figure as possible.

Procuring of this food for relief feeding is primarily a job of the Federal Surplus Relief Corporation. Information as to where the needed supply might be found and the specifications upon which it should be bought or evaluated is supplied by AAA representatives. Actual purchasing by the FSRC is with money which has been allotted by the Federal Government to the state agencies. In most cases, the spending of this money for the states and the placing of the foodstuff in the hands of state distributors accounts for the major part of the free food handled through the emergency distribution channels.

However, there are three other factors which are to be taken into account:

1. AAA buys and holds for itself some commodities, particularly meat, butter, cheese, and lard. The magnitude of this AAA activity is indicated by the table data published on page 276 of the June, 1935, issue of Food Industries.

2. The states themselves do some purchasing; but in most cases this buying appears to be small in volume except in the case of beef, which will be discussed more fully in connection with the third factor. Apparently most of the buying by the states is of fresh fruits or vegetables and commodities which have not been processed. In many cases, the buying represents an effort to salvage what would otherwise be wasted because of an oversupplied local market. For obvious reasons the distribution of each state's purchases is near the point of procurement. The FERA has no record in Washington of these commodities purchased by the states with money allotted to them for relief purposes. Data can be obtained only by writing to each state administrator. The same fact applies whether the states have purchased food and processed it or have purchased it at some wholesale or retail outlet.

3. State agencies have been given a substantial amount of live beef on the hoof. In the sense that the slaughter of these cattle is arranged by states and that the fresh or canned meat is taken for subsequent distribution through the state agencies the distribution is through non-commercial channels. Of course, it should be understood that the FSRC is the purchasing agent for this food commodity and that the distinction is that the live animal rather than the product slaughtered under the federal control goes to the state.

Only the distribution of this beef seems to be large enough in volume to be a substantial factor in the non-commercial handling of foodstuffs through other than the FSRC channels. It has been estimated that the volume of this state slaughtered beef may amount to nearly as much as that slaughtered by the Federal agencies.

An analysis of the procurement contracts awarded by FSRC and AAA for commodities to be distributed through the Federal Surplus Relief Corporation for the period from Jan. 1, 1935, to July 1, 1935, may be found in the following list of commodities:

Evaporated Milk	37,595,200 lb.
Dry Skim Milk	8,647,850 lb.
Cheese	50,000 lb.
Butter	1,300,000 lb.
Beef Tongue	57,240 lb.
Canned Beef	3,040,437 lb.

In addition to the volume of canned meat procured through the FSRC contract, this relief agency received warehouse certificates for approximately 149,000,000 lb. of canned meat produced by states for distribution to other states. Also the FSRC received fresh, boned, and miscellaneous meats from states for distribution to other states. The State Emergency Relief Administration organizations were authorized under FSRC purchases authorities to buy commodities such as apples, potatoes, sweet potatoes, and syrup which have been designated as local surpluses by the Department of Agriculture. The states making these purchases were reimbursed by special grants from the FERA. In some cases these commodities were distributed within the state of purchase and in other cases part of the purchases were turned over to the FSRC for distribution to other states.

Authority to purchase 3,000,000 bu. of wheat to be milled into flour and 2,000,000 lb. of green, unshelled peas for canning has been given, but as of June 30, 1935, no purchases of these commodities had been made, according to the information that is available.

The commodities in storage or on hand which contractors claim available for distribution by the Federal Surplus Relief Corporation as of June 30, 1935, consist of 95,976 lb. of canned veal, 49,083 lb. of canned mutton, and 114,771,667 lb. of canned beef. Commodities to become available for distribution by this corporation upon completion of AAA procurement contracts consist of 1,300,000 lb. of butter, 50,000 lb. of cheese, 2,240,000 lb. of dry skimmed milk. Commodities produced on state programs for which FSRC holds warehouse certificates and which are available for distribution through FSRC as of June 30, 1935, 69,967,134 lb. of canned meat. The State Emergency Relief Administration agencies have on hand in addition to the canned meat turned over to the Federal Surplus Relief Administration on warehouse certificates, 105,000,000 lb. of canned beef; 13,000,000 lb. of canned veal; 4,000,000 lb. of canned mutton; 3,000,000 lb. of fresh meat and 60,000 lb. of prepared meat, making a total of 125,060,000 lb. of meat still in the hands of the state agencies. With the exception of the canned beef this inventory of meats on hand in the states is as of May 31, 1935.

Comprising the more than 350,000,000 lb. of foods distributed to the various states and territorial areas during the period between Jan. 1 and July 1, 1935, the following commodities and quantities have been reported:

Apples (fresh)	3,527,664 lb.
Butter	4,000 lb.
Beef (boned)	7,019,713 lb.
Beef (canned)	85,155,567 lb.
Beef (fresh)	4,491,481 lb.
Beef (tongue)	2,798,104 lb.
Cheese	6,906,679 lb.
Milk (evaporated)	37,595,200 lb.
Milk (dry skim)	6,407,850 lb.
Mutton (canned)	19,985,204 lb.
Potatoes (white)	122,577,800 lb.
Potatoes (sweet)	111,871 lb.
Rice	11,974,704 lb.
Syrup	422,152 gal.
Veal (boned)	113,587 lb.
Veal (canned)	20,708,271 lb.
Veal (fresh)	11,565,021 lb.
Veal (tongue)	521,573 lb.

In the following table is given a breakdown of the total amount of food distributed by the Federal Surplus Relief Corporation for the period from Oct. 1, 1933, through March, 1935. This breakdown is given in thousands of pounds for the individual states and territories in which each commodity has been distributed. In some instances, the commodities have been produced in the state in which they are distributed, but for the purpose of this study the amount given represents that distributed in the individual state because distribution is the factor which affects the markets of the commercial food manufacturer and distributor.

Commodities Distributed in States and Territories Between Oct. 1, 1933 and April 1, 1935, in Pounds (000 omitted)

Commodities Distributed in States and Territories Between Oct. 1, 1933 and April 1, 1935, in Pounds (000 omitted)

	Apples—dried	Apples—fresh	Beans	Beef—boneless	Beef—canned	Beef—fresh	Beef—tongues	Butter	Calf—tongues	Cabbage	Cereal—foods	Cheese	Flour	Goat—canned	Lard	Milk—dry skim	Milk—evaporated	Mutton—canned	Pork—salted	Pork—smoked	Potatoes	Rice	Sugar	Syrup Gallons	Veal—boneless	Veal—canned	Veal—fresh
Alabama					2,856			1,559			310	409	3,313		478	200	766	130	2,782	4,569	3,680	2,160	180	50		130	
Arizona			150		754		93	392	16		120	165	718	162	144		209	130	767	1,129		200	60			32	568
Arkansas					1,389			1,502			721	291	4,099		555		452	97	1,967	7,004	1,800	1,360	120	29		97	1,761
California	819		200	120	721		48	2,512	9		721	711	4,778		645		1,148	212	3,594	6,717		1,400	360			224	31
Colorado		180	250		300		56	448	11		244	240	3,049		264	120	452	97	1,204	1,569		440	120			65	1,473
Connecticut			160		2,571	252		706		891	172	177	967		140			65	1,027	1,315	1,280	280	81			65	21
Delaware					141			86		130	50	70	204		28		35	32	324	178	160	40	10			32	
District of Columbia			80		678			390			105	191	570		116	40	139	32	190	669	720	200	49			32	
Florida					2,950		3	1,805			426	422	3,847		509	280	974	130	2,227	5,774	3,520	2,200	180	68		130	
Georgia					2,307		56	1,113			406	374	3,174		449	160	835	130	1,362	6,079	3,240	1,920	180	42		130	
Idaho		240			450		2	260			80	140	398	32	100	80	139	32	410	754	1,116	120	30		25	32	
Illinois		1,263	340	1,009	21,655	2,043	617	5,519	136		1,316	997	7,379		1,236		2,227	459	8,264	12,030	1,440	2,761	640	91		445	8,317
Indiana			150	252	2,442	3,941	32	2,012	2		676	373	2,628		436		766	162	2,425	3,633		841	240	51		149	119
Iowa		872	50		1,432	429	164	756	35		305	276	1,110		432		592	65	1,354	2,105	612	526	120			73	2,439
Kansas		784			1,059		485	643	94		240	243	1,547		464	120	278	97	1,399	1,821	5,328	399	120			100	22
Kentucky			100		2,936		2	1,534		2,364	610	333	3,070		898	285	940	130	4,721	5,346		932	240	113		130	
Louisiana					2,198			126				250	2,505		222	120	522	65	2,005	4,233	2,240	1,320	120	31		65	
Maine				1,401	572			297			80	142	429		56		70	32	345	779	1,160	120	30			32	
Maryland				9,407	977	6	16	591	3	543		142	967				244	65	715	1,724	1,960	400	80			67	
Massachusetts			150		5,359		13	2,046	1	6,171	520	511	3,161		477		696	229	2,349	3,504	13,840	1,160	300			227	1,933
Michigan			500		10,523	539	20	3,826	4		1,280	710	7,065		1,703		1,183	259	4,666	10,851	6,480	1,377	300			259	11,265
Minnesota		1,905			3,311	63	216	980	74		250	349	1,387		474		592	169	1,765	2,660		1,000	300			164	2,315
Mississippi					1,882			1,014				263	2,849		281	120	557	97	2,476	3,915	2,720	1,600	120	35		97	
Missouri			80	567	1,942	2,038	89	1,331	11		400	317	2,634		741		1,079	194	1,601	3,705	4,104	759	180	43		194	897
Montana		390			120			380			120	179	706	97	224	80	244	32	629	764	1,800	200	60			32	
Nebraska		360			719		149	328	20		96	138	2,441	65	231		244	194	210	1,014	1,548	203	60			65	
Nevada		30			159	206	2	101			40	101	129		10	40	35	32	153	243		40	10				15
New Hampshire					442	353		107		127	80	67	253		28		104	32	240	370	800	120	20			32	
New Jersey			210		3,723		10	1,939	2	7,843	490	473	2,936		759		1,044	194	2,861	3,635	13,440	1,200	300		63	206	
New Mexico			50		392			42			80	115	561		84	40	104	189	481	836		200	50			32	
New York			800	115	19,352	20,000	70	10,217	12	8,762	3,888	1,826	19,707		3,257		2,192	648	8,755	25,937	30,676	4,727	1,080		7	648	30,048
North Carolina					1,826			511			320	160	1,965			120	696	97	2,434	3,183	2,960	1,640	180	36		97	
North Dakota	66	571	120		909		9	377	2		120	184	546	65	146	160	487	130	276	750		400	60			65	
Ohio			249		6,173	2,474	79	4,081	7		1,204	953	7,054		1,006		1,496	356	6,236	13,590		2,138	480	99		359	17,890
Oklahoma		1,252	70		3,045		144	831	24		721	307	6,378	227	452	360	1,264	378	2,285	6,260	6,264	2,200	180	36		194	287
Oregon		420			1,709		10	600			120	210	1,430		84		244	52	1,003	933		200	40			35	466
Pennsylvania			400		8,333	42	7	3,483		2,543		940	6,057		414		3,167	486	1,614	3,619	10,800	3,393	800			486	
Rhode Island					496	727	7	391		546	120	64	535		80			32	491	991	1,520	200	40		9	32	1,251
South Carolina					2,223	1,113		1,960			558	330	2,655		389	120	800	130	4,050	6,076	2,720	1,680	120	32		97	84
South Dakota		871			1,578		16	1,009	3		320	309	1,854	97	528	80	452	389	886	3,477		480	120			97	
Tennessee					1,995	38	9	1,495			450	240	2,648		272	240	626	97	1,668	5,431		1,880	180	106		97	
Texas			490		63		272	3,776	64		961	584	10,926		1,396	440	1,740	333	4,175	16,583	18,164	1,640	420	72		324	1,638
Utah		510	70		414		2	431			124	114	841		106	40	244	32	722	1,211		200	60			37	42
Vermont					122			21			40	48	200				35	32	120	314		40	10			32	
Virginia					1,211	21	9	521		1,395	360	185	1,254		200		278	65	1,140	1,605	1,600	400	90			65	105
Washington					2,605	351	27	1,062	6	673	200	231	2,889		140		418	65	1,056	1,895		412	120			67	712
West Virginia			180		2,382		6	1,812		4,526	451	317	2,760		761	200	557	130	3,138	4,561	3,080	732	180	100		130	
Wisconsin		120	150		2,478	897	35	827	4		320	363	1,944		402		452	139	2,140	2,571	4,032	692	160		10	130	2,189
Wyoming					204			95			40	94		32	56	40	35	32	68	300	306	80	20			32	
Alaska					62								49														
Puerto Rico			1,874		3,942																						
Virgin Islands					130			55			40		2,940		2,000		1,670	999	384	2,000	2,240	1,720				324	
													960				35	32	60	186	80	40					
Total 10/1/33 to 4/1/35	885	9,768	6,873	12,871	138,213	35,532	2,776	67,904	544	36,515	20,296	16,627	144,468	778	23,874	3,486	33,558	8,439	97,213	200,397	157,430	50,373	9,000	1,035	114	6,692	85,889

Processing department in Morrell branch. Contributing to the efficiency of this department is a traveling hoist (right) which lifts meat into and out of the soaking vats in baskets holding 300 pieces.

Built for Efficiency

PART ONE

Modern methods, layout and equipment eliminate waste motion and speed operations at the Brooklyn branch of John Morrell & Co.

By FRANK K. LAWLER
Assistant Editor, FOOD INDUSTRIES

ONE of the most efficient branch houses in the meat packing industry, the Brooklyn, N. Y., establishment of John Morrell & Co. is modern from the basement to the top of the smokehouse tower. The building is of recent construction, the equipment is new and there are innovations in processing, materials handling and clerical procedure.

The branch distributes a complete line of beef and beef products, pork and pork products, lamb and veal. It also handles a full line of smoked meats, canned meats, sausage and dog food. These products are supplied by truck from the branch to an area within a 50-mile radius of New York.

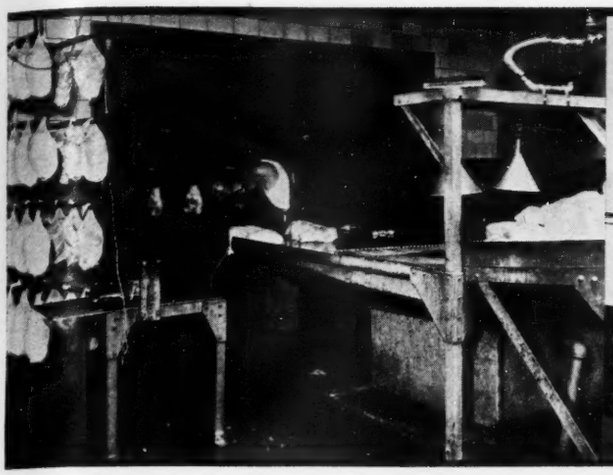
In the way of processing, the Brooklyn branch smokes hams, bacon and shoulders and boils hams. The processing department embodies construction, equipment and practices a step in advance of what is found in many meat plants. All the equipment is in one room, a space about 60x65 ft. with a hard-brick floor and glazed-tile walls. Windows along one side and six 9x6-ft. ventilating skylights make this an unusually light and airy department.

TWO elements in this processing department stand out for novelty and efficiency. One is a battery of ham-soaking vats. The other, traveling smokehouses. In soaking the meat, the product is not placed directly in the vats, as is the customary practice. Instead it goes into perforated steel baskets, called cages, which lower into the vats and are handled with a traveling electric hoist. A cage remains in the vat from one to five hours, depending on the nature of the meat, during which time clear running water removes enough of the surface salt to give the meat the desired taste and a bright color.

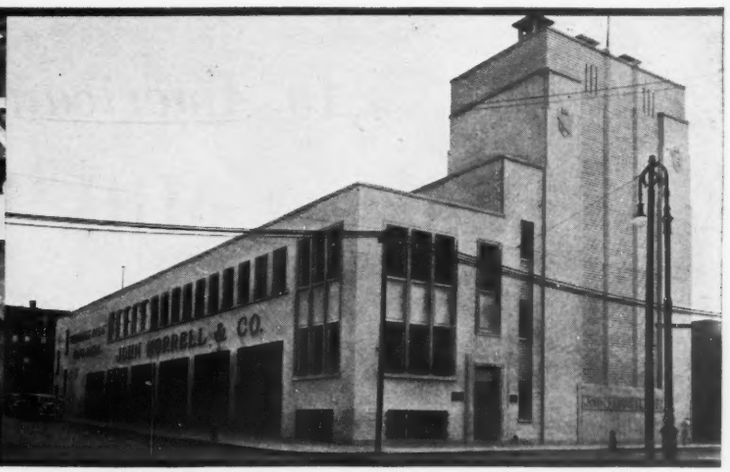
When soaking is completed, the cages are carried along an overhead rail by the traveling hoist to a washing table near the smokehouse doors. After washing, the meat is placed in stockinets and hung directly on the cross bars of the traveling smokehouses. Three smokehouses, each with a capacity of 20,000 lb., gives this plant a weekly smoked-meat production of approximately 300,000 lb. Two of the smokehouses are traveling units. Extending the height of a 70-ft. tower, each of these is the equivalent of three stationary houses one on top of the other, yet all the meat is put in and taken out on one floor. This saves the labor and expense of hauling it up and down in the elevator.

But the big advantage attributed by Morrell to this type of smokehouse is that it gives better quality through a uniform smoke and produces less shrinkage. Since the meat travels up and down the full height of the tower fifteen times each hour, every piece is subjected to all conditions in the smokehouse to the same degree. If these houses were stationary, one above the other, the meat in the lower part would get too much heat and take on more color than that up high unless it were shifted from one place to another, which would mean an appreciable expenditure of labor as well as frequent opening of the smokehouse doors.

Mechanically, the traveling smoke-



Traveling smokehouses are used in the modern Morrell branch. The equivalent of three stationary houses one above the other, this type is loaded and unloaded on one floor. Note the portable ham washing table.



This building, which houses the Brooklyn branch of John Morrell & Co., was judged the best industrial structure erected in Brooklyn in 1932. An attractive building, it is laid out for efficient handling and processing of meats.

house comprises endless chains connected by cross-bars. The chains are driven by a motor, and they travel up and down the tower, passing over sprocket wheels at the top and bottom. The meat gradually works toward the back, and on coming down the last time is carried forward toward the door to start the cycle over again. Time of smoking varies from 24 to 28 hours for the standard smoke; the temperature, from 110 to 150 deg. F. The smokehouses are fired with charcoal briquettes, use hickory sawdust and have steam coils to supplement the charcoal fire for bringing up the temperature.

IN ADDITION to the equipment already mentioned, there are in the processing room three galvanized-steel vats for cooking hams, a 20-ft. galvanized-iron table with two wooden cutting boards for boning hams, a galvanized-iron, steam-jacketed cooking kettle, equipment for washing ham boilers, a foot press for the boilers and a scale for weighing the meat as it goes out of the room on an overhead rail.

Many food companies use direct-expansion ammonia coils in refrigerated rooms, but Morrell selected an ammonia-brine (calcium chloride) system for the Brooklyn plant. There are three cooling rooms and two sharp freezers in the plant, all cork insulated. In the coolers the temperature is between 28 and 34 deg. F.; in the sharp freezers, 0 deg. In these rooms banks of brine coils hang from the ceiling, with wooden drip pans underneath them. In the room where smoked meat is held and where wrapping is done, the temperature is comparatively high, so this room is cooled by air blown over a small bank of brine coils and through two large ducts extending across the ceiling.

Hot water and steam for processing in the plant, as well as for heating the building in winter, come from a 40-hp., automatic, oil-fired, low-pressure boiler. The heat is transmitted to the air in the building through fan-type, unit heater-coolers hung from the ceiling, these units also cooling the building in summer. Believing in cutting costs wherever possible, Morrell has installed in the basement equipment to handle the plant laundry.

Efficiency is not confined to the processing departments in this modern branch plant. Systems of inter-office, inter-department, and inter-plant communication have been set up to facilitate management, sales and clerical operations. The branch manager communicates with Morrell's Western divisions about fifteen times a day, on the average, and to avoid waiting for messenger boys to pick up and deliver messages to and from the telegraph office, a teletype system has been installed. An outgoing message is "typed" in the company's private code, and it goes directly by wire to the main telegraph office. Incoming messages are received in the reverse manner, coming in on "ticker" tape. This saves easily one hour each way.

INSIDE the plant itself there has been installed a pneumatic message carrier of the type familiar in department stores. With this, written information, such as a sales slip, is sent from department to department. Here's one place where it comes in quite handy: Two or three salesmen in a first-floor office sell by telephone, write their orders on slips of paper and send them via air tube to the credit manager on the floor above. The credit manager checks them, o.k.'s the credit and sends them via air tube to the shipping office downstairs. And after the shipment goes out, they go to the accounting department, again by air delivery. Obviously, the system saves much time and facilitates the work.

Nor is that all. There is an inter-department telephone system in the building by which the manager can talk to any supervisor in the plant merely by dialing his number. And the manager's phone is equipped with a "holding" button so that he can retain an outside call while he uses his phone to get information from some other office or department. This type of telephone service naturally comes at a higher rate.

To handle the local deliveries, the branch operates eight 2 to 3-ton trucks with insulated bodies. Twelve salesmen's cars also are maintained and the company has its own garage, with repair facilities. Recently, tests have been made with solid-CO_2 refrigeration in the trucks, this being found advantageous in the hot summer months.

Among the most important aspects of this modern Morrell branch are plant layout, materials handling and materials of construction. These will be discussed in detail in the October issue of FOOD INDUSTRIES.

An American Looks at

Market Milk in England

The first of four articles on European dairy manufacturing and marketing practices

By H. A. BENDIXEN

Associate Professor of Dairy Husbandry, State College of Washington, Pullman, Wash.

THE average American tourist doing Europe in three months, might never suspect that there is a dairy industry in that part of the world. If he eats entirely in restaurants and hotels on his trip, he will seldom see a glass of milk served except to children. Yet they do use milk in Europe.

In England milk is used to whiten tea and sometimes coffee, and the reason for considerable amounts of *sterilized* bottled milk being sold by many milk plants in England seems to be the fact that tea and coffee are whitened more effectively by sterilized milk than by pasteurized or raw milk. Incidentally, of course, cream is too expensive to use and furthermore the sterilized milk will keep longer.

Sterilization in the foregoing case means heating the milk in a bottle to about 212 deg. F. for 20 minutes. In the fine, new milk plants of the Midland Counties Dairy, Ltd., at Wolverhampton and Birmingham, which I visited, it was done in large, continuous, immersion-type sterilizing machines. An interesting feature in one of these plants was a large pressure-equalizing storage tank (steam accumulator) built in the center of the wagon yard from which all steam was distributed to the different machines.

The equipment in this beautiful and spacious plant was all of the latest types comparing favorably to the finest plants in the United States. This was also true of the United Dairies, Ltd., plants in London, supposed to be the largest dairy company in the world with some 12,000 employees handling 1,000 tons of milk daily. The milk is brought in from a large number of country plants in large glass-lined tanks on trucks and railroad cars, and is processed and bottled at several central plants in the city, from which it is delivered to distributing depots in trucks, some of them carrying 1,500 gal. of milk in crates. From the distributing depots, peddlers deliver the milk on small carts to the consumers' homes or the milk is sold at stores.

THE dairy laws of Great Britain require a minimum of 3 per cent fat and 8.5 per cent solids-not-fat and permit no preservatives. Besides the sterilized milk already mentioned, there are sold in England, three grades of raw milk and two of pasteurized milk which are defined as follows:

Certified Milk—Produced and bottled on a licensed farm from tuberculin-tested cattle. Bacterial counts when delivered to the consumer must not be over 30,000 per cc. Coli forms must be absent in 0.1 cc.

Grade A Tuberculin-Tested (T & T) Raw Milk—Produced on a licensed farm from tuberculin-tested cattle. Usually bottled by distributors. Bacterial count not over 200,000 per cc. when delivered. Coli forms absent in 0.01 cc.

Grade A Inspected Raw Milk—Produced on licensed farms, cows not tuberculin tested, but are examined at intervals by a veterinarian. Bacterial count the same as for Grade A (T & T) milk.

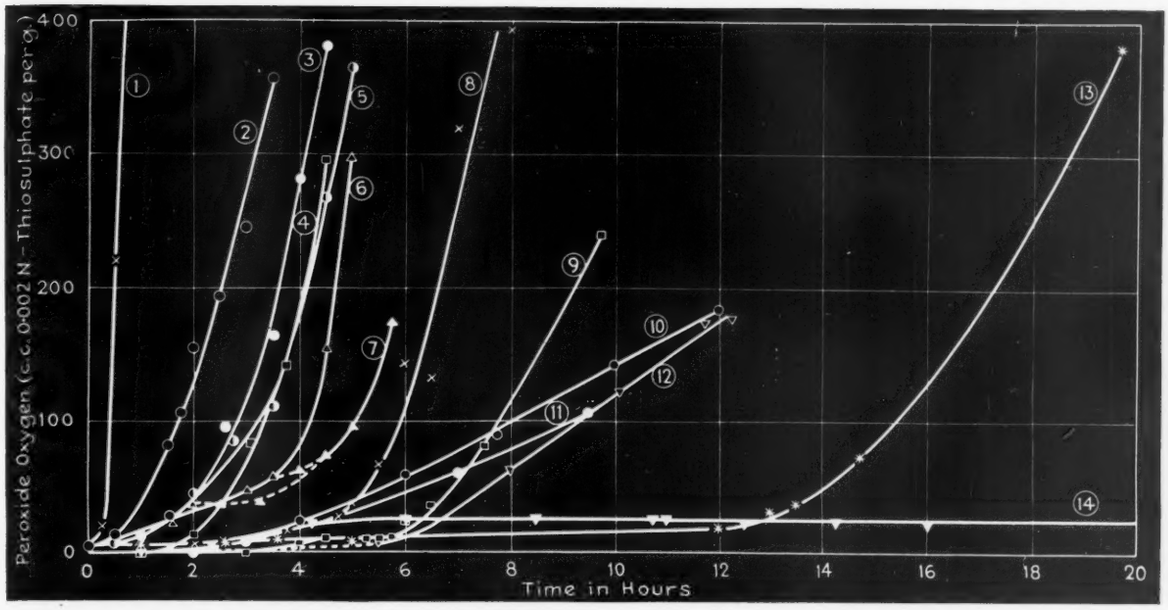
Grade A Pasteurized Milk—Milk heated to 145 to 150 deg. F. for at least 30 minutes. Bacterial count not over 30,000 per cc. Coli forms absent in 0.1 cc.

Pasteurized Milk—Heated to 145 to 150 deg. F. for at least 30 minutes. Bacterial count not over 100,000 per cc. Coli forms may be present.

Dairy laws in Great Britain are administered by local authorities only and the impression one receives in traveling about England is that they are enforced in the largest cities, but that in the smaller cities and in the villages very little inspection exists. In one city, not far from Birmingham, a dairy was selling milk as "sterilized milk," which, according to the owner, had been emulsified and heated to only 130 to 140 deg. F. in order, as he said, to preserve its color. In the villages the milk supply was generally very poor, with sanitary conditions not too good on the farm and in small plants.

One is struck by the great contrast between the fine up-to-date milk supply conditions in the large cities and the frequently almost primitive conditions prevailing in other places. Sometimes even in the large cities, the two conditions were observed side by side. Much of the milk is dipped on the street or drawn through a spigot from a container on a cart.

The flavor of the milk was usually poor. It was invariably boiled in the home and few children seemed to drink milk. Still it was most difficult for me to convince an English college instructor in dairying that America is not a terrible country in which to raise children. One of the first questions he asked of me was, "Is it really true that in America 20,000,000 children suffer from curable diseases?" Later I learned that to him, New York and a few other Eastern cities make up America, a very common misconception in Europe.



Comparison of the rates of oxidation of various natural oils and fats

(Initial peroxide oxygen (cc.0.002 N thiosulphate per gram)

1 Cod-liver oil, fresh commercial	3.9	8 A proprietary vegetable cooking fat	2.1
2 Lard, commercial (sample 1)	4.3	9 Beef brisket fat, laboratory rendered	0.3
3 Lard, commercial (sample 2)	2.5	10 Beef kidney fat, laboratory rendered	0.2
4 Leaf lard, laboratory rendered	0.2	11 Beef kidney fat, laboratory rendered (sample 2)	0.0
5 Olive oil, commercial	6.9	12 Butter fat	0.3
6 Cottonseed oil, fresh commercial	0.5	13 Castor oil, commercial	3.3
7 Cottonseed oil, commercial	11.6	14 Egg oil, laboratory extracted	0.3

Oxidation of Fats and Oils

Studied in Simple Experiment

COD-LIVER OIL is highly susceptible to atmospheric oxidation and quickly becomes rancid. Egg oil and castor oil have the opposite characteristics, being decidedly stable. In between are lard, olive oil, cottonseed oil, vegetable cooking fat, beef brisket fat and butter fat. These are facts determined by a simple, yet accurate method recently described by Colin H. Lea in *The Journal of the Society of Chemical Industry* (Dec. 21, 1934).

Typical oxidation curves for a number of fats and oils, determined by this method, are given in the accompanying figure. It is interesting to note that in the case of beef brisket fat, curve 9, the initial increase in peroxide oxygen appears to be arrested for about an hour before rapid absorption begins. Signs of the same behavior are observed with cottonseed oil, curve 7, though less definitely. Curve 14, for egg oil, a substance which contains a high percentage of lecithin, is decidedly unusual. The peroxide value increases in the normal manner for about four hours and then remains practically constant for twenty hours, when it terminates. While no definite conclusion can be reached without further evidence, it appears that these breaks in the oxidation curves might be due to the action of antioxidants, perhaps carotenoid pigments in the beef fat and lecithin in the egg oil.

The initial peroxide oxygen for each of the products studied was as given under curve.

IN MAKING these oxidation determinations, the fats and oils were dispersed on filter papers and heated to a high temperature in an oven. In detail, the procedure is to fit the filter papers with loops of thread from which they may be suspended, then weigh them and immerse them in the oil or melted fat. Next, press them between sheets of filter paper to remove excess oil and weigh them again. Now, quickly transfer them to glass jars which have been heated in an oven to 100 deg. C., and maintain a constant temperature. The jars used are 2-lb. preserve containers equipped with loosely fitting lids, glass hooks being attached inside the lids by soldered wires. A jar is removed at intervals, the paper is treated with powdered potassium iodide and glacial acetic acid-chloroform solution, and the peroxide content determined in the usual manner.

In this, as in all oxidation tests accelerated by heat, the degree of reproductility obtainable depends upon the accuracy of the temperature control. A variation of one degree is sufficient to produce a very appreciable error.

Job Analysis

*To Determine Production Costs and Improve Labor Relations**

By F. A. BUESE

Industrial Engineer, E. J. Brach & Sons, Chicago, Ill.

WHETHER we like it or not, we, each of us, are competing not only with other members of the confectionery industry, but with other industries for the consumer's dollar. For this reason it behooves us to study the subject of labor costs carefully and continuously. On a subject as large as that represented by labor costs, my remarks will be merely introductory, yet they will be sufficient to illustrate the need for close attention to such expenditures and, I hope, arouse some group thinking about methods of equitable control over these costs.

Labor may be classified as: (1) Direct productive, represented by employees who are engaged directly in making and packing the products; (2) Indirect productive, represented by the foremen and supervisors who have charge of the direct workers; (3) Non-productive or service, represented by maintenance, receiving department, boiler room, and electrical department employees.

By improvement in utilization of labor one usually means control through piecework or other incentives. Such control should follow the determination of accurate standards of performance because a rate or a bonus standard cannot be set intelligently unless the possibilities of production are known. A standard of performance is the amount of output per day at a rate which can be consistently maintained. It is not the maximum output for an hour, or any short period, because there are various delays which must be recognized.

Standards of performance may be determined by either of three general methods. The first is by referring to past records. An example of this method is found in a machine of a certain kind which may have produced 1,000 lb. per hour of a certain product for a given period of time, possibly a month. On that basis we may then say that in the future the standard production will be 1,000 lb. per hour. Past records have the weakness that they represent what has been done and never show what may be done. The frequent result is that after a standard has been set for the machine, we find that the average production has been increased.

TO OVERCOME the objections of relying upon past records, a school of thought, pioneered by Taylor during the closing years of the 19th century, began detailed time study analyses of factory operations using a stop-watch. Time study properly performed consists in observing and reporting the time taken for each small part of an operation. In making such time studies, the job is timed as it is being done, presumably by a relatively experienced operator. Such studies have the weakness that the time records are simply on the job as it is being done without determining the possibilities for improvement. It cannot give us the standard for a new class of work where experienced operators are not available and where no comparisons are feasible.

The third method for determining standards of performance is by motion study. Under such a system, operation motions are carefully analyzed and those giving the best sequence for practical use are selected as standard. From this standard the proper time for the job can be determined. Thus, a standard of performance for an expert operator can be approximated even when no such operator is available. Also, when properly done, a standard of performance is obtained which represents the best for the equipment to be used, and the objections to both time study and past records have been overcome.

Only after standards of performance have been established by one of these methods can piece rates or bonus standards be set or the output of any piece of equipment be calculated. By knowing the production per shift for a worker or for a machine, we can then calculate the money to be paid for any output.

Even when a standard of performance has been set, we discover that there are many methods of paying wages. However, all of these may be put into three classes: A. Employer takes all gains in production or absorbs all loss, the common example is day work. B. Employee gets the benefit of all gains or suffers a penalty for all losses; piecework is the best example—in most modern applications, however, there is a guaranteed minimum wage so that the worker does not absorb extremely large losses. C. Employer and employee share gains or savings in cost and also losses or increases in costs; in this classification we find most bonus and premium plans.

THE installation of incentive plans requires tact and the appreciation of the worker's viewpoint. There is little to be gained in the long run by a hard-boiled attitude on the part of the employer. The incentives will not be permanently successful unless the savings are generously shared with the workers. And, whenever possible, the basis of calculation should be made simple enough so the employee can figure his own pay.

Statement is frequently made that the use of an incentive sacrifices quality. As a matter of fact, an incentive can be used to improve quality by paying a bonus for improved workmanship. This may be in the form of a cash bonus, a higher piece rate for high-class workmanship, or there may be a penalty for poor work.

Usually, incentive plans are applied to the direct workers first. Their application to foremen and supervisors is equally important and in many cases should precede use on direct workers. In determining a departmental foreman bonus, labor costs, scrap control, and material control are factors frequently included. The

(Turn to page 468)

*From a paper read before the National Confectioners' Association Convention in Chicago on June 5, 1935.

New Method of Testing Eliminates All Excuse for

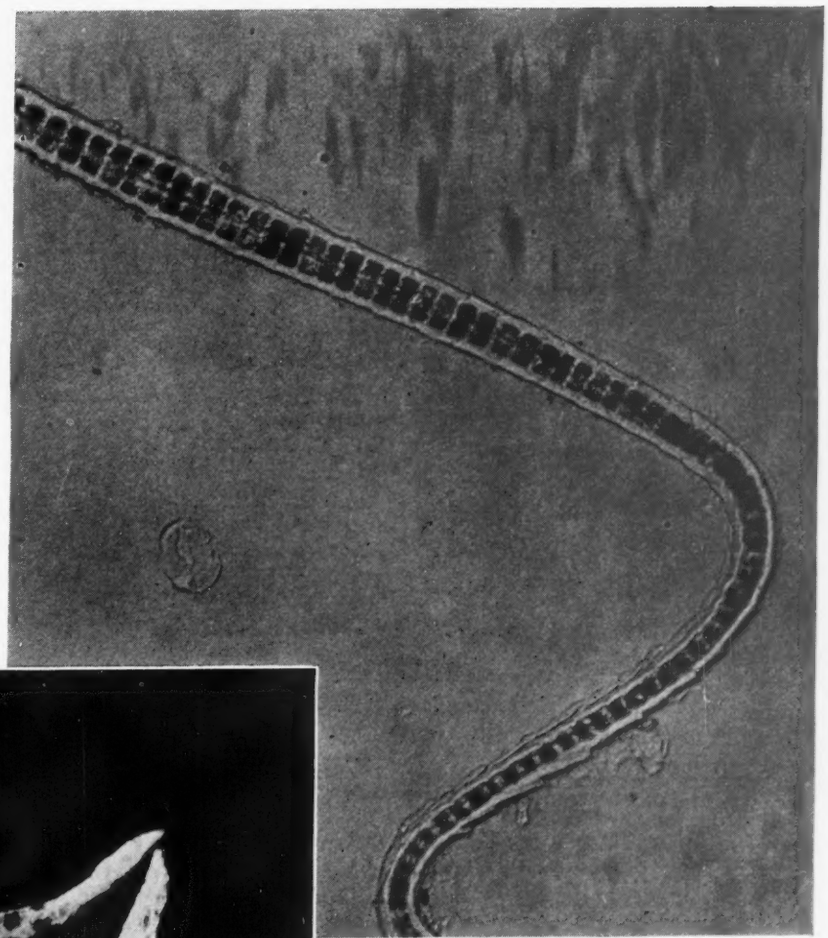
Filthy Butter

ASTONISHING items about butter have appeared in Notices of Judgments issued by the U. S. Department of Agriculture within the past twelve months.

Butter, which most of us have heretofore regarded as the substance that gets into trouble only on account of short-weight or too-high moisture content, has been repeatedly cited and condemned because of the presence of filthy foreign matter.

Not a pleasant subject to discuss in public, it is still less pleasant to read about it in official Notices of Judgment and learn that rodent hairs, rat excreta, insects and other disgusting and nauseating substances have been found in butter offered for human consumption.

At the outset of the appearances of these notices of condemnation, it appeared as if these seizures were confined to small, little-known producers—producers who were making their initial entrance into butter production and doing a pretty rotten job of it. The unfortunate incidents carried the earmarks of industrial growing pains (or "somethin' ") but, as the months passed by, it was apparent to one observer, at least, that something unusual was up. When well-known concerns, the products of which have had a reputation for good quality, were suffering seizures for filthy butter—concerns which have been in business for years and have



Highly magnified photograph of a mouse hair discovered in butter by the Department of Agriculture's new method.

Photomicrograph showing maggots detected in butter by the new method of microscopic examination described here

control laboratories and certainly ought to know better—then the question about the origin of this new and unexpected series of seizures takes on a new significance.

A clue to its true import was discovered in a reading of the testimony of Walter G. Campbell, chief, Food and Drug Administration, when he was testifying before a Senate Committee that was considering the agricultural appropriation bill.

At that hearing Mr. Campbell testified that a new method for testing butter had been developed in his Bureau which was being used effectively in apprehending filthy butter appearing ni the channels of interstate commerce.

Heretofore the only method of making a microscopic analysis of butter was to dissolve the butter fat from a sample and examine the undissolved residue under a microscope. But the casein, a normal constituent of butter and not soluble in organic solvents, obscured the view of any foreign matter that was suspected to be there. Hence a research was made for some way to dissolve out the casein without also destroying the foreign matter. Borax was finally discovered to be the right substance. The new method involves the treatment of butter with a hot borax solution to render the casein curd soluble, then filtering and washing the residue. By this method, debris or other foreign matter in butter is left on the filter paper where it can be discovered by a microscopic examination.

Full directions for carrying out the method are printed herewith so that all readers of FOOD INDUSTRIES who have anything to do with butter may be able to perform their own tests and avoid a "blind spot" that heretofore has existed regarding butter. From now on there can be no excuse for either filthy butter or filthy raw materials.

A Method for the Detection of Filth in the Form of Insects and Other Extraneous Materials in Butter

By WALTER S. GREENE

Microanalytical Laboratory, Food and Drug Administration, U. S. Department of Agriculture.

ORDINARY methods of flotation cannot be used, since the filth recovered from butter varies greatly in its density. When attempts are made to melt and filter the butter, the casein left on the filter interferes to such an extent that it is almost impossible to discover the contaminants. The following method was evolved and proved to be rapid, simple and inexpensive to operate.

Method. Weigh out 100 grams of the butter from each sub-division in a 400 cc. beaker. To this add 150 to 200 cc. of borax solution made by dissolving 40 grams of borax in 1 liter of water (stronger alkaline solutions must not be used as they are destructive to hair). Heat on electric hot plate to boiling. Filter at once through a 7 cm. Buchner suction funnel equipped with a rapid filter paper, wash the paper with gasoline to remove any remaining grease and then with hot water. When a butter contains mold, either finely divided or in clumps, it may close the pores of the paper so that as many as 10 separate papers are required in extremely moldy butter to filter one sample.

After investigating brands of filter paper supplied by different dealers and manufacturers, the most efficient found was No. 86, seven cm., made by Max Dreverhoff and supplied by Heil Corp., 210 S. 4th St., St. Louis, Mo. As an aid in filtering, a circle of copper screen, 50 mesh, is cut about 6.5 cm. in diameter and fashioned to lie in the bottom of the funnel. The paper is then placed over this making sure that the paper and screen are centered to make a tight seal and not allow any material to pass under around the edges. The paper may be moistened with water to hold it in place before pouring the butter solution into the funnel.

By the above described method, the curd is changed by the borax solution into a soluble caseinate and therefore all of it readily passes through leaving no deposit on the filter paper. When mold is present in the butter, it is retained on the filter paper either in a finely divided condition or in large clumps which sometimes resemble undissolved curd, but if this material is scraped off, placed on a microscope slide with a drop of oil or glycerine and pressed out quite thin, the mold filaments may be seen. An estimation is made of the total square area that would be occupied by the mold clumps if they were all moved in together. Search should be made of the sides of the Buchner funnel to insure that no mold, insects or other foreign material has been retained there. In connection with distinguishing the material as mold, the analyst must bear in mind the distinguishing characteristics between mold and paper since occasionally fragments of the latter have been found.

Attention is called to the fact that in those cases where a slimy residue is recovered on the filter papers which is suggestive of mold, it is our practice to always verify this by making examinations of a small portion of the substance under a compound microscope. This caution is because of the fact that it has sometimes been found that such residues are in the main composed of curd with but little mold present. The reason for this variation in different samples we have not yet been able to answer to our full satisfaction, but the fact remains and this method of verification has been followed to avoid erring on such a condition.

The filter paper is examined with a wide-field binocular microscope, with lenses giving a magnification of approximately 15-20 X. A lower magnification may be used to find larvae but the 20 X is recommended for other material. Hairs, fragments of insects and other contaminants except mold are removed with a needle, placed in a drop of glycerine on a slide and covered with a cover glass for further examination.

FOOD PACKAGES and PRODUCTS

Addition to Salt Family. Another package has been redesigned by International Salt Co., Inc., Scranton, Pa., to give it a family resemblance to the company's other containers. The 2, 3, 4, 5 and 10-lb. bags of Purity table salt now appear in the new style, and their attractiveness is evident from the accompanying illustration, which shows the old containers in the background. This is a step in the company's far-reaching package redesign program, the new salt-bag design tying in with that of the revamped containers for "Sterling" table salt, ice cream salt, sausage seasoning and smoked salt described in FOOD INDUSTRIES, May, 1935. Wide bands of "International" blue with reverse white lettering, first used on the Sterling package, feature the design of the new "Purity" bags. Clean-cut and easily read, the design has a modern tone and yet is sufficiently conservative that it will not have to be changed soon to keep pace with the whims of fancy stylists.

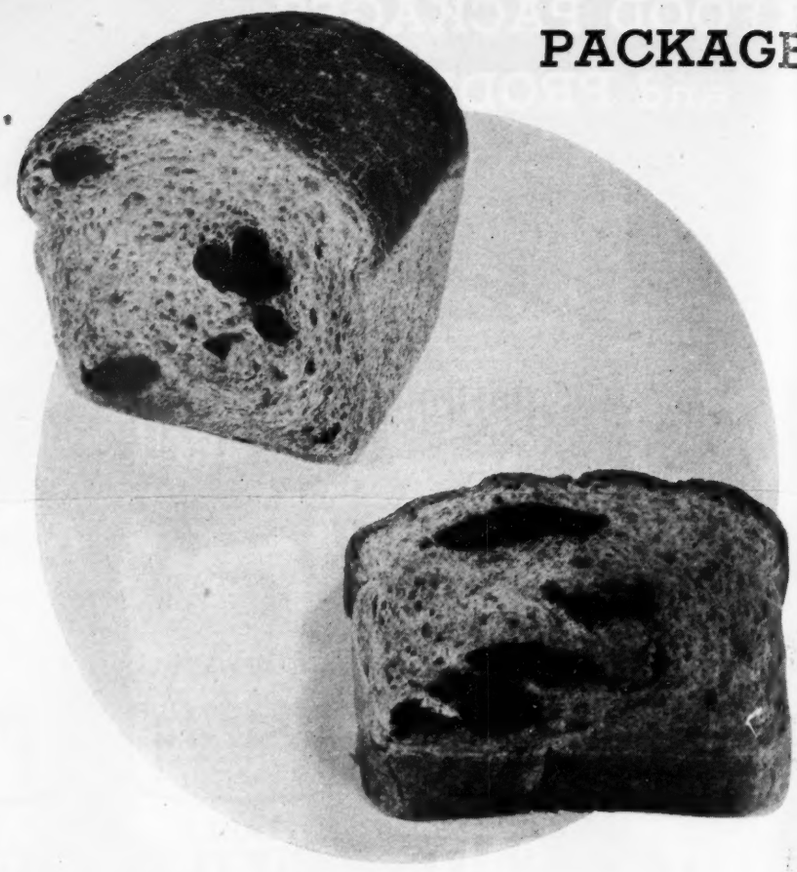
Cereal Breakfast. "Wheat Farina," " a breakfast in itself," has been put on the market by Harlan City Roller Mills, Harlan, Iowa. The product is made from the hearts of "specially selected spring and winter wheat to get the best in the way of protein and gluten." Distributed in western Iowa, the material has met with success, the company reports, and it is expected to go even better this fall and winter when cooked cereals are more in demand. Wheat Farina is packaged in 3½-lb. paper bags.

Another Canned Beer. "Tru Blu," a beer with a reputation of long-standing among the Pennsylvania Dutch, has gone modern. It now reaches consumers in tin cans, as does its companion product, Tru Blu ale. Made by Northampton Brewery Corp., this beer and ale are in cans said to be capable of withstanding a pressure of 115 lb. per sq.in. The beer is kept out of contact with the can by a special lining comprising a base coating with a "protective" coating over it.

Pineapple Fingers. That the product will lend itself better to attractive arrangement in salads, desserts and fountain specialties, pineapple is being packed in strips instead of slices by Hawaiian Pineapple Co., San Francisco. Called "Royal Hawaiian Spears," the strips are packed in a tall tin can, there being almost

5 ft. of pineapple to the can. The tin carries an attractive label, two-thirds of which is taken up with an appetizing illustration of a group of pineapple spears.

Prune Bread with Prunes. A new specialty health product for bakers has been developed by American Molasses Co., New York. It is a prune bread "with a prune in every slice" and containing a third of whole-wheat flour. It is designed to capitalize on the widely publicized "regulatory" value of the prune and the dietary attributes of whole-wheat flour. The recipe calls for 40 pitted prunes. While these are torn somewhat in the mixing, they remain in fairly large pieces so as to be readily noticed in the baked loaves.



Self-Heating Food. A can of the food used by Pan-American Airways to provide transoceanic pilots with hot meals without operating stoves in the planes has been obtained by FOOD INDUSTRIES and is shown in an accompanying illustration. Described in detail in the June issue, the product comprises an ordinary can of food which sets inside a "chemical stove." The stove is merely a larger can with two compartments, one containing unslaked lime, the other water. With the can upside down, a pointed instrument is inserted at certain points in the bottom. This pierces holes in the partition between the water and lime, permitting these to mix and generate heat. Packed in Holland by Tieleman & Dros, Leiden, the label is in contrast with American ideas of an effective design.

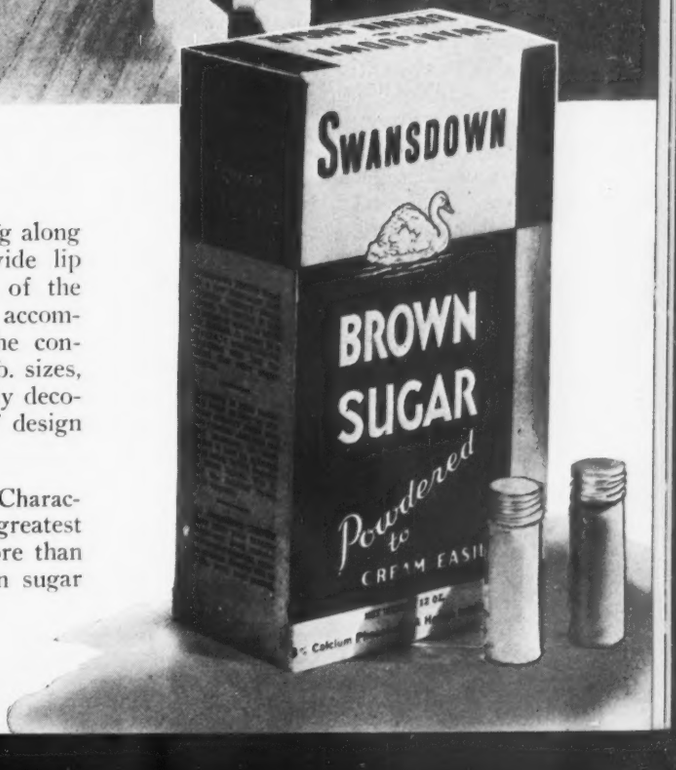
Opens With Match. Having decided to pack its Italian-style tomato sauce

under vacuum to "reassure its keeping qualities," Rusio Products, Philadelphia, wanted a closure which would open easily despite the vacuum in the glass jar. So it selected a metal screw cap so designed that the vacuum can be broken with a match.

There is a small hole in the center of the cap, and this is covered by a rubber valve which keeps out the air and maintains the vacuum. To make the screw cap easy to remove, the consumer merely inserts a match in the hole to open the valve and break the vacuum.

Pickles in Ash Tray. When a food packer adopts a reuse container, he must make sure of three things—that the use to which the empty container is to be put appeals to the consumer, that the design of the package does not interfere with its smooth flow through the packaging machinery, and that the cost is not out of line with the price of the merchandise. All three of these considerations are met in the ash-tray jar adopted by Seeman Bros., Inc., New York, for its "White Rose" sweet gherkins. This container is a squat, bowl-shaped jar closed with a metal screw-on cap. There are no labels on the glass, which is decorated by a raised band and a series of ridges. The cap design gives the container its reuse value, there being a hole in the center through which the ashes fall into the empty jar, and three radial depressions to hold cigarettes. The hole is covered by a piece of cardboard fitted inside the lid. On the underside of the cardboard is a thin sheet of moistureproof, airtight material made from rubber, which forms a "hermetic" seal. The only label on this package is one about an inch in diameter which is glued to the cardboard piece and shows through the hole in the cap.

Non-Sifting Sugar Box. A problem in sugar packaging has been licked by W. J. McCahan Sugar Refining and Molasses Co., Philadelphia. This company has adopted for its sugar cubes an interesting new type of carton designed to prevent sifting of the powdered-sugar residue. The big problem involved in the development of this container lay in providing the necessarily wide opening flap without resorting to unsightly sealing to prevent sifting. This difficulty was solved by a carton which is in effect a box within a box. The top piece of the package opens after cutting along dottel lines, and it has a wide lip which fits between the walls of the inner and outer boxes. The accompanying illustration shows the construction. Made in 1 and 2-lb. sizes, the new carton is appropriately decorated with a light "sun-burst" design on a dark background.



Powdered Brown Sugar. Characterized by its creators as "the greatest improvement in sugar for more than 25 years," a powdered brown sugar

FOOD PACKAGES

is now being manufactured. Developed by R. C. McAteer Co., Pittsburgh, it is said not only to do everything that ordinary brown sugar will do in "half the time" and with "half the effort," but to have special uses of its own. Other attributes accredited to the new sugar are that it will not harden or become sticky. The product contains 3 per cent of calcium phosphate and certain mineral salts "of health value." An interesting characteristic of the sugar is that it is quite light, almost white, in appearance because of the fine particle size. But as soon as it is moistened, it takes on the familiar brown color.

Jelly Preparation. An unusual product in an interesting package has been put into distribution by Sardik Laboratories, Inc., New York. The product comprises dehydrated cranberry pulp packed with sugar ready for making cranberry jelly. All the housewife has to do is add water, boil for one minute and pour into molds or glasses. Freshly picked, ripe cranberries are used in making the product, these having the skins, water and seed removed by a new process. The jelly preparation is put up in a paper bag contained in a paperboard carton. Two layers of loose-wrapped waxed paper enclose the carton, the inner one being plain and the outer having the label design printed on it in colors. To make sure that the housewife adds the correct amount of water in making the jelly, the bag containing the product is used as a measuring "cup," a water line being printed on it.

Cup-Cake Mix With Cups. If ovens came in half-pint sizes, one probably would be included in the "Cuplets" package of Flako Products Corp., New Brunswick, N. J. Appreciating the sales value of making a product convenient to use, this company is marketing its cupcake mixture in a carton which also contains twelve charproof paper cups—enough to accommodate the ten ounces of mix in the package. Baked in these cups, the cakes are ready to set on the table, and there are "no pans, no greasing, no fuss, no bother" on the part of the cook. The package for this combination is a cardboard carton with a window which displays the cups. Contained in a bag, the mixture occupies the bottom two-thirds of the carton, while the cups nest in the top part in a cardboard receptacle. Protecting the contents is a transparent-cellulose wrap. Because the package has only recently been perfected, it now is being filled by hand, but machines are being made to do the job.

New Beer Bottle. As an answer to the tin cans recently introduced for beer, Owens-Illinois Glass Co., Toledo, announces a one-trip beer bottle of lighter weight and shorter height than the standard bottle used by brewers. Appropriately named "Stubby," the new bottle is less in height by 31 per cent, measuring $6\frac{13}{16}$ in., as compared with $9\frac{1}{2}$ in. for the standard bottle. The cubical content of a carton of 24 is said to be substantially less than for the regular bottle, and 24 bottles filled and cartoned weigh but 37 lb., according to the manufacturer. The short bottle can be handled on existing bottling equipment, the necessary adjustments involving little expense, it is said. The new container, which costs less than its predecessor, is shown in an accompanying illustration under the "Wholesome Beer" label.

Spaghetti and Meat Balls. Another ready-to-serve meat product, packed in an effectively labeled can, has been put on the market by Armour & Co., Chicago. It comprises spaghetti and meat balls, Italian style, and is a "Star Quality" item. In addition to semolina spaghetti and meat balls, the product contains English cheddar cheese, butter, sugar, fresh cream and tomato sauce. The meat balls are made from lean pork and beef. Packed in 14-oz., enamel-lined tins, there is enough of the product in one can to serve two people. Of mod-

ernistic design, the label pictures a plate of spaghetti and meat balls.

Fresh-Kept Beets. Believing that the use of the vacuum pack has marked advantages in the retention of both the original color and flavor of the beet, Snider Packing Corp., Rochester, N. Y., is vacuum-sealing its latest contribution to the table—small "Rosebud" beets. These beets are packaged in a glass jar with a resealing cap that is removed by prying with the back of a knife. The

container permits the beets to exercise their eye appeal, and the attractiveness of the package is enhanced by a neat label. Snider's "Fresh-Kept" beets are packed with a little less than one tablespoon of clear water to the can.

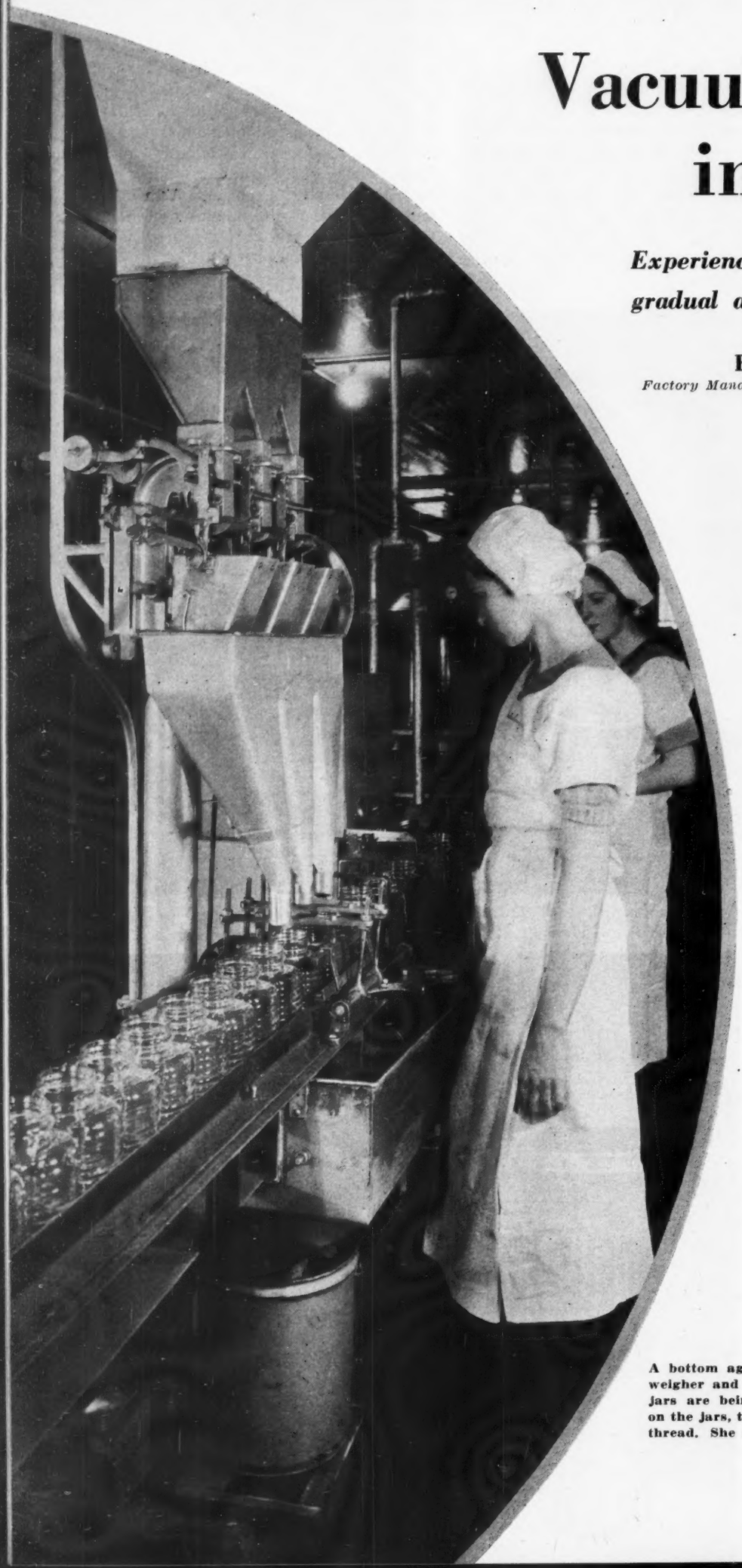
Streamlined Pickle Jar. Pickle packers are catching up with Nature in the matter of design. Streamlined pickles have been growing for many a year, and now they are being packed in a streamlined jar by Hirsch Bros. & Co., Louisville. Having broad shoulders and tapering toward the bottom, the jars not only are decorative in their conformation to the shape of the pickle, but they give the effect of size. Enhancing the appearance of the package are ridges in the glass which travel down the sides and partially across the bottom of the front panel with a pleasing sweep. Adopted primarily for "whole" pickles, the package also has been applied to the "Sweet Pickle Chips" of Hirsch Bros. Topping off these containers are attractive pry-off metal caps which may be used for resealing.

Comb Honey in Glass. If it's a good idea to put strained honey in glass jars, then it must be sound packaging sense to put comb honey in a container which permits it to exercise its appetite appeal. So reasons T. W. Burleson & Son, Waxahachie, Texas, which has adopted glass jars for both products. In addition to their display value, these containers have the merchandising advantage of being reusable in the home. One of the containers takes the form of a "pail," giving variety to the line.

Vacuum Packing in Glass

Experience with coffee shows that gradual air removal is essential

By C. E. KAFKA
Factory Manager, National Tea Co., Chicago, Ill.

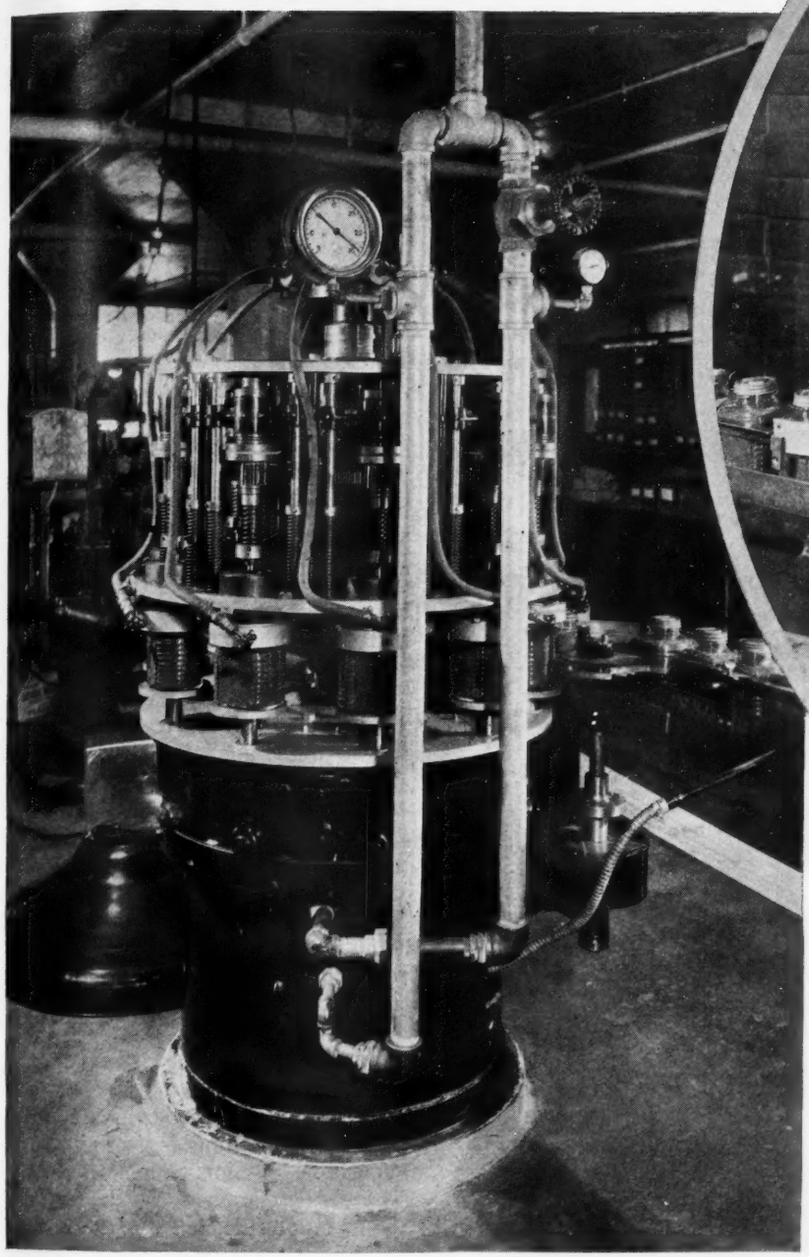


A bottom agitator works better on this automatic weigher and filler than a side agitator when glass jars are being filled. The farther girl puts caps on the jars, turning them barely enough to start the thread. She also controls the operation of the line.

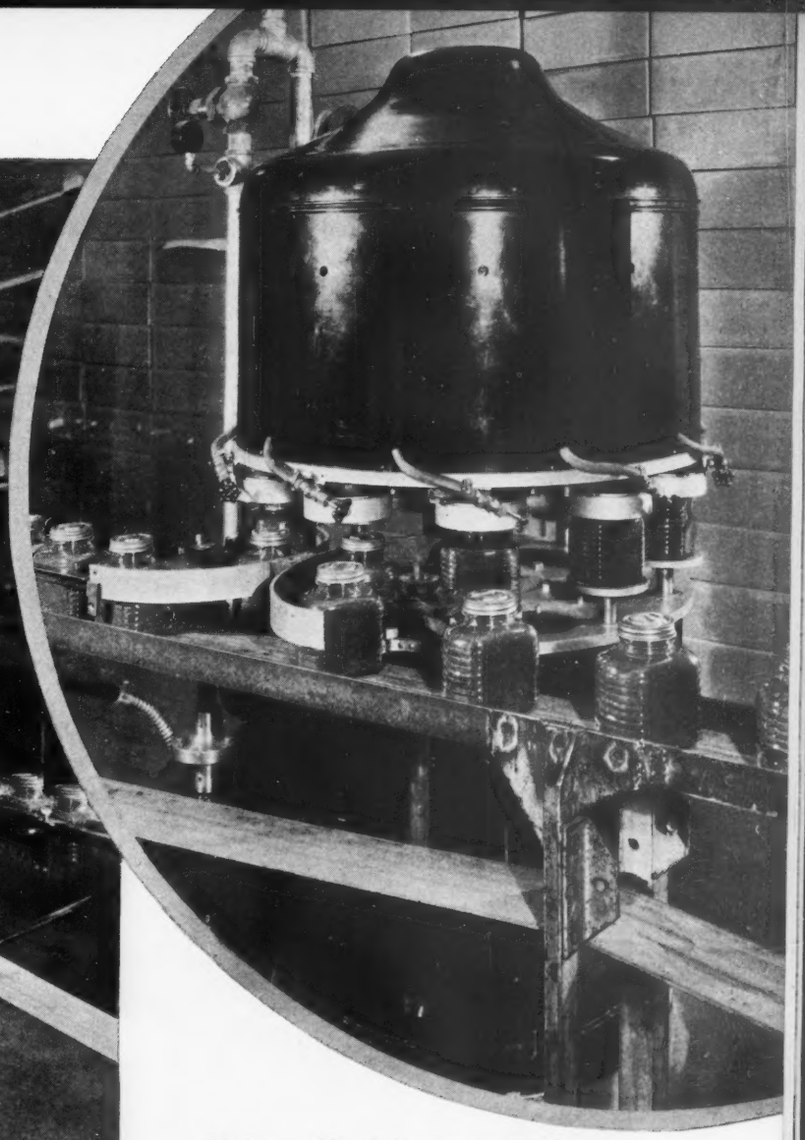
VACUUM PACKING is not new to us. For several years National Tea has been selling vacuum-packed coffee in tin cans. We are thoroughly familiar with the reason for avoiding contact of oxygen with freshly roasted coffee. The destruction of flavor by oxidation is well understood and we have been able to greatly retard it by vacuum packing in cans. Likewise, the necessity of removing the air from the can to make room for the carbon dioxide gas escaping from freshly roasted coffee is well understood. High vacuum was and is the answer to all of these problems, and we therefore have been continually on the alert for a method of obtaining a higher vacuum in our coffee packages. We also wanted a package that could be resealed; and visibility was desirable.

This meant a glass package, but the earlier attempts of glass manufacturers to promote the sale of coffee in glass were not always entirely happy. First it was tried without vacuumizing and its failure brought about a method of removal of the air from the jars; but this also was unsatisfactory, because it was impossible to open the jar without puncturing the cap to release the vacuum, and this ruined its reseal value.

None of the available early devices for removing screw caps from vacuum-packed glass packages proved satisfactory from our viewpoint until



This is the low-vacuum side of the continuous vacuum jar capping machine with its cover removed. Note the two branches of the vacuum line, the one on the left running full size to the vacuum pump, while the one on the right is slightly throttled to bring the 29-in. vacuum down to 26 in.



Discharge side of the vacuum capping machine. Caps are automatically screwed on tight before emerging.

the invention of the slotted-type screw cap, in which the blade of a table knife could be inserted to give the necessary leverage to permit its easy removal by a woman and yet retain its reseal value.

As soon as such a development made it entirely practical to package coffee under high vacuum in glass, we asked the glass company to create for us an entirely original package that would not resemble any coffee package then in existence. The result was a jar that combined protection of the flavor of the coffee with maximum display value. It could be attractively labeled, it was easy to open and reseal and it had the usual re-use value in the home.

Because the finished cost of the glass package was about the same as the finished cost of the tin package, we decided to offer them side-by-side in our stores at the same price and watch results. The preference for the glass jar was so general that we decided to discontinue the use of the can.

THE first equipment supplied for vacuumizing was of the batch type because the efforts to accomplish vacuumizing of the jars individually on an automatic line were at that time unsuccessful. This was because the vacuum acted too suddenly, and sudden application of a high vacuum resulted in something almost akin to a miniature explosion of the air between the particles of the coffee. This caused particles of coffee to be drawn between the cap-gasket and the top edge of the jar, thereby interfering with a perfect seal.

Furthermore, the earlier batch-type machine was not entirely satisfactory because it was impossible to obtain a uniformly high vacuum in all jars. Also, it was necessary to tighten the caps after they were vacuumized, which made an additional operation, aside from the possibility of disturbing the seal and losing some of the vacuum. This objection was overcome by the development of a continuous vacuum jar capping machine by the Owens-Illinois Glass Co., who also had developed the jar and the cap. Their first machine came to our plant in Chicago about a year ago, where we placed it on our production line and

connected it to the same dry vacuum pump which we had been using previously.

We found that we could now obtain a higher vacuum in the glass jar than in the tin can, with absolute uniformity. This condition was accomplished by the new vacuum capping machine and was not because of any differences inherent in the containers themselves. In the case of tin cans, they are vacuumized and sealed individually, and rather quickly, and the evacuating time is too short to remove relatively as much air before the lid is sealed on.

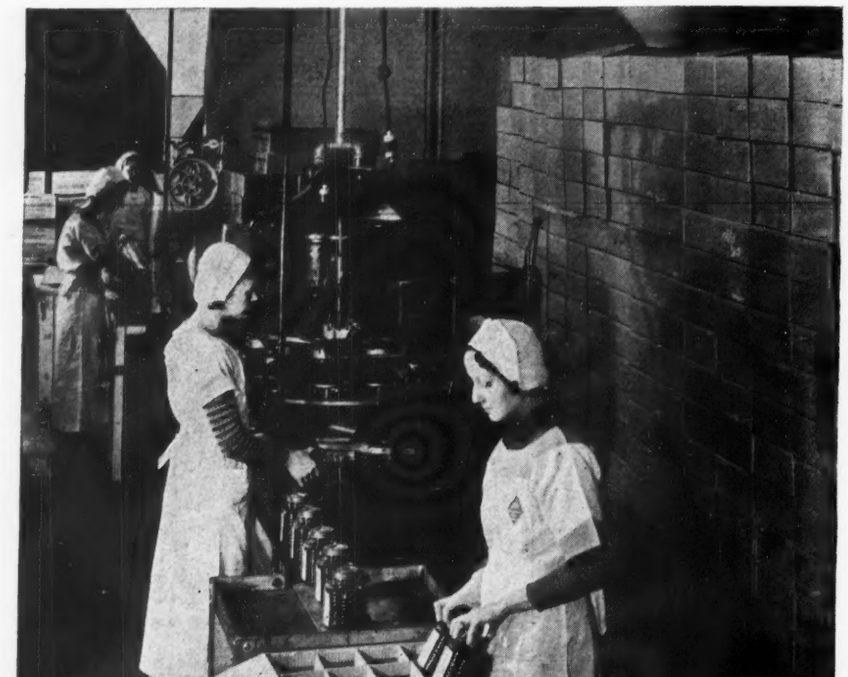
THE packing line for glass is simple, consisting of a Hoepner Automatic Weighing and Filling Machine, filling 33 1-lb. jars per minute in lots of three jars each. The machine is equipped with a home-made bottom agitator, replacing the side agitator used for cans, which settles the coffee well down into the jar as it flows from the scale hopper.

The first station on the conveyor is a felt wiper which removes any particles of coffee which may rest on the top edges of the jars and might prevent a perfect seal. Next, a girl places the caps on the jars, turning them just sufficiently to start the thread. Then comes the combination vacuumizing and cap-tightening machine. The automatic feed places the jars, exactly centered, successively on each of the ten vacuumizing stations on the machine. As the machine revolves, the jar-rest rises, forcing the shoulder of the jar against a soft rubber yoke, forming an air-tight compartment. This compartment is first connected with a 25-in. vacuum, which continues for about one-half the revolution of the machine. And in this period most of the air of the jar is drawn out through the screw threads (remembering that the cap is barely threaded on). At this point and continuing for about the next one-third revolution, the compartment is connected with a 29-in. vacuum in order to complete the removal of the air.

This two-stage vacuumizing is accomplished by two leads from one vacuum pump line (provided the pump capacity is ample) and by restricting the suction in one of the lines by means of a valve. This accomplishes a slower and more gradual removal of air, eliminating all sealing troubles arising from coffee particles being blown upon the jar edges.

At this point, the screw cap is tightened by a revolving gadget which moves down, engaging the slot in the cap and tightening it as tight as its adjustable friction clutch determines. The automatic valve in the head of the machine then releases the vacuum in this compartment, the jar-rest moves down, lowering the jar, which is then pushed onto the labeler conveyor by means of a timed cam.

AN IMPORTANT feature of the line is the push-button control, operated by the girl who places the cap on the jars. No supervisor is needed for the vacuum-capping machine. If there are any gaps in the line of advancing jars, she stops the machine momentarily. The idea is to keep every position of the machine occupied in order to avoid any variations, caused by gaps, in the vacuum applied to the jars. For, after all, if vacuum is essential it should be kept uniform. It is our opinion, however, that the immediate future has in store many changes in coffee merchandising.



Four girls operate the packaging line. A push-button switch beside the girl who puts the caps on the jars controls the operation of the capping machine.

PROMOTING *the Product . . .*

Most novel of recent schemes for promoting the sale of sugar is that of Western Sugar Refinery, San Francisco. This company prints patterns for toys on the backs of its cotton bags for "Sea Island" sugar. When the bags are empty, children can easily cut out the figures, sew them together and stuff them. A variety of patterns keeps consumers coming back.

▶ PREMIER-PABST CORP. introduced its "Tapacan" export beer in the Chicago market Aug. 21, using intensive newspaper advertising to put it over. Other cities in which it is sold include Rockford, Ill.; Cedar Rapids, Iowa; Dallas, Houston and San Antonio, Texas; Memphis; Atlanta; and Boston.

▶ CONTINENTAL CAN CO. will continue this fall to sell consumers on canned foods with full-page color ads in national magazines, these featuring the slogan "Health and Freshness Sealed in Cans." Continental Can will also give away "tie-in" posters.

▶ WISCONSIN CHEESEMAKERS' PUBLICITY ASSOCIATION is raising an annual appropriation of $200,000. Wisconsin potatoes will be advertised to the extent of $6,000 through a state appropriation.

▶ OYSTER INSTITUTE OF NORTH AMERICA has been formed to "make the public aware of the health and taste values of fresh oysters." The organization also will promote high standards of quality and service within the industry.

▶ MILWAUKEE SAUSAGE MANUFACTURERS' ASSOCIATION has launched a cooperative advertising campaign to run a year and designed to acquaint the housewife with quality sausage.

▶ CAMPBELL SOUP CO., Camden, N. J., has tripled the sales of its chicken soup through its radio program, "Hollywood Hotel," according to a statement made during a recent broadcast.

▶ BOWMAN DAIRY CO., Chicago, is using large daily newspaper space to feature delivery service to business offices.

▶ STANDARD BRANDS, INC., New York, has distributed a list of 23 practical "household hints," some of which pertain to making coffee.

▶ SWIFT & CO., Chicago, will put its Sigmund Romberg program on the air again Sept. 10, over 41 stations of the NBC network. The program will be reduced to one-half hour.

▶ NATIONAL BISCUIT CO., New York, has been using full-page advertisements in Chicago daily papers to promote hot-weather sales of "Shredded Wheat."

▶ BORDEN CO., INC., New York, renews, beginning Sept. 4, "The Puzzlers," a dramatic program broadcast Wednesday evenings over WOR.

▶ M. S. HERSHEY, founder of Hershey Chocolate Co., has constructed a model plant in Hershey Park, Pa., to show visitors how ice cream is made.

▶ WHEATENA CORP. starts Sept. 10 with a tri-weekly program, "Popeye," over an NBC network.

▶ HALLIGAN CORP., Davenport, Iowa, is offering an automobile, electric refrigerator and radio for the most empty coffee containers presented within a specified time.

▶ ROBERT A. JOHNSON CO., Milwaukee, is sponsoring an original radio serial drama of American home life on Monday, Wednesday and Friday mornings over WTMJ.

▶ PHILADELPHIA DAIRY PRODUCTS CO. went on the air over WOR, Aug. 13, with a Tuesday, Thursday and Saturday afternoon program, "Martha Deane."

▶ DUGAN BAKERIES of New York and New Jersey will distribute to 300,000 housewives and 200,000 stores a new publication, "Highlights," carrying promotional copy for its products and some local advertising. Printed in rotogravure, the publication will feature advance abstracts from articles in women's magazines, and it will have sections devoted to fiction, housekeeping, foods, babies, patterns and what not.

▶ DETROIT RETAIL GROCERS' ASSOCIATION finds that sales of bread have increased in Detroit since the establishment of four, instead of two, legal loaf sizes.

▶ WM. WRIGLEY, JR., CO., Chicago, is distributing another 10,000,000 three-stick sample packages of chewing gum.

▶ HORLICK'S MALTED MILK CORP., Racine, Wis., will sponsor over an NBC network daily, except Saturday and Sunday, the "Lum 'n' Abner" program, beginning Sept. 2.

▶ COLUMBIA BROADCASTING SYSTEM, INC., New York, has prepared a booklet of value to food advertisers. Entitled, "CBS Night and Day Listening Areas," it contains separate maps of night and day listening areas for each of the 97 CBS stations. Comprehensive market data also are included.

▶ WEBB PUBLISHING CO., St. Paul, has published a booklet, "The Rich County Food Market," giving useful information on the buying of prepared foods by farmers.

▶ NATIONAL INDUSTRIAL ADVERTISERS' ASSOCIATION will hold a convention in Pittsburgh, Sept. 18-20, at the William Penn Hotel.

Design of Refrigerated Truck Body for

Cheese Peddler Routes

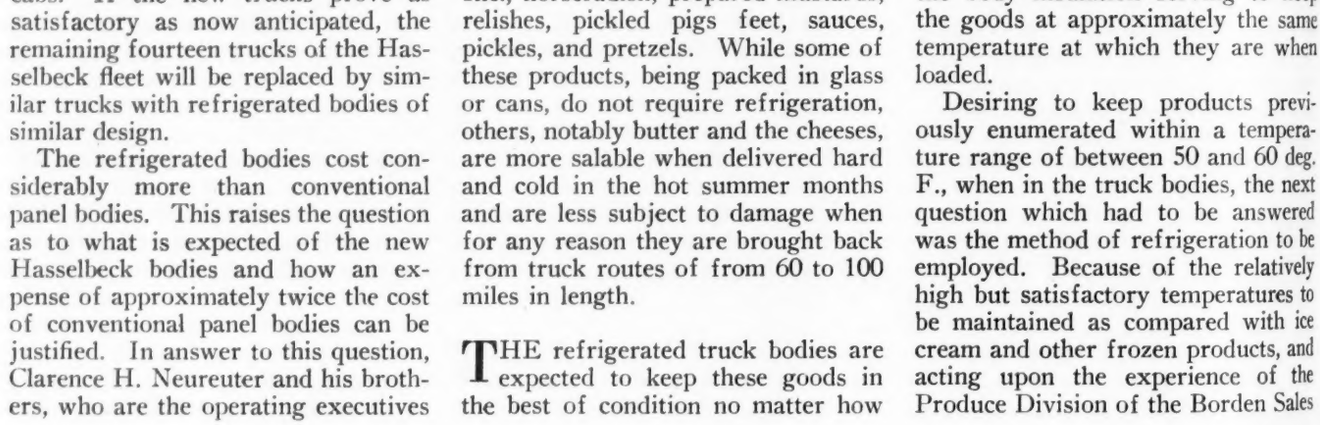
ANOTHER in the long list of food companies that have adopted refrigerated truck bodies so far in 1935, the Hasselbeck Cheese Co., Inc., the oldest cheese and allied food products distributor in Buffalo, N. Y., has recently put into service a fleet of six trucks with fully insulated and refrigerated bodies. These new trucks replace an equal number of older trucks fitted with ordinary panel bodies and integral cabs. If the new trucks prove as satisfactory as now anticipated, the remaining fourteen trucks of the Hasselbeck fleet will be replaced by similar trucks with refrigerated bodies of similar design.

The refrigerated bodies cost considerably more than conventional panel bodies. This raises the question as to what is expected of the new Hasselbeck bodies and how an expense of approximately twice the cost of conventional panel bodies can be justified. In answer to this question, Clarence H. Neureuter and his brothers, who are the operating executives of the Hasselbeck company, believe that the use of refrigerated bodies will enable them to deliver their products in better condition than ever before. They believe further that this will be reflected in increased sales volume against any competition.

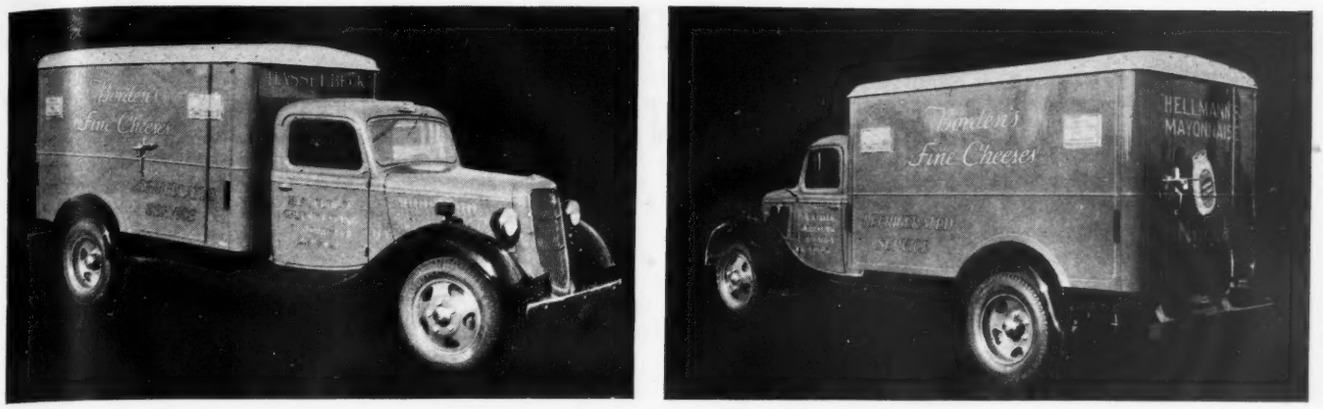
The principal food products distributed by the Hasselbeck company are the entire line of Borden's cheeses, butter, Hellman's mayonnaise, Nucoa, other items in the line of Best Foods, Inc., horseradish, prepared mustards, relishes, pickled pigs feet, sauces, pickles, and pretzels. While some of these products, being packed in glass or cans, do not require refrigeration, others, notably butter and the cheeses, are more salable when delivered hard and cold in the hot summer months and are less subject to damage when for any reason they are brought back from truck routes of from 60 to 100 miles in length.

THE refrigerated truck bodies are expected to keep these goods in the best of condition no matter how long the truck is out or how far it runs in even the hottest weather. Also, the insulated bodies are expected to keep the goods from freezing in the extremely cold weather for which Buffalo and its vicinity are well known. Of course, it is expected that refrigeration will only be required in the three summer months of June, July and August, and possibly part of September. For the balance of the year, no refrigerant will be required, the body insulation serving to keep the goods at approximately the same temperature at which they are when loaded.

Desiring to keep products previously enumerated within a temperature range of between 50 and 60 deg. F., when in the truck bodies, the next question which had to be answered was the method of refrigeration to be employed. Because of the relatively high but satisfactory temperatures to be maintained as compared with ice cream and other frozen products, and acting upon the experience of the Produce Division of the Borden Sales



Rear and side elevations of one of the six new Hasselbeck peddler route cheese trucks with a refrigerated body. Note the location of the 150 lb. water ice bunker in the front left corner of the body and also the 15 in. wood slat shelf extending along the left side near the roof. This shelf is used to carry small, individual packages. Note also the side and rear full-height doors. The latter can be opened and closed while the truck is backed up against its loading platform. Except for the shelf and the ice bunker, the interior is clear without any dividing bulkhead to make refrigerated and non-refrigerated compartments.



Left and right side views of one of the new Hasselbeck peddler route cheese trucks showing the proportions and lettering of the refrigerated body. Note the separate driver's cab. The cab, hood, wheels and body are painted a deep red with the lettering in gold. The Borden's cream cheese and Chateau cheese decals are in natural colors. The fenders and running-boards are painted black. The metal body roof is painted aluminum. All the door hardware is chromium plated. The body is refrigerated with a water ice bunker to maintain an interior temperature of between 50 and 60 deg. F.

Co., Inc., in maintaining like temperatures for the truck delivery of butter, eggs and poultry, the Hasselbeck company, which is affiliated with the cheese division of the Borden company, choose water ice as a refrigerant. This is cheap and easy to procure. Likewise, the bunker in which water ice is carried is low in first cost, has no moving or mechanical parts, and has practically no maintenance expense.

Next came the questions of integral versus separate truck cabs; the inside dimensions of the body and the desirability and practicability of dividing the interior into two compartments, one refrigerated and one not refrigerated, for those products not requiring refrigeration.

While all previous Hasselbeck bodies had integral cabs, separate cabs were selected for the new trucks because of low first cost as standard equipment with the chassis, better general appearance of cab and body without an extreme drop from the top body roof line to the top of the windshield in the front, less cab maintenance, and the ability to transfer the body to another chassis should this become desirable.

In regard to body dimensions, length and width were dictated principally by frame length and width, leaving only the height as a matter of choice. The inside height of 5 ft. was decided upon to permit the driver to load and unload with relative ease without making the body too high in proportion with the cab and other parts of the chassis. One righthand side door and one rear door, both the full height of the body, are provided. The bottom of the rear door is sufficiently high above the ground to permit it to be opened and closed while the truck is backed up to the loading platform.

IN RELATION to dividing the body into refrigerated and not-refrigerated compartments by a traverse bulkhead, it was decided that the relative difference in cost between refrigerating all or part of the body with water ice would be so small as to make the partition unnecessary. Accordingly, the interior was left as one unobstructed compartment.

As to the necessity of a tranverse bulkhead in order to maintain adequate interior body temperatures, it was decided from the experience with the Poultryland Produce Division trucks using the same type of ice bunker, that so long as the goods were not over 40 deg. F. when loaded into the body, they could be maintained at not over 60 deg. F., with as many as 100 door openings per day. The ice bunker cannot be expected to bring down the temperature of the goods as loaded but can prevent a rise of more than 20 degrees if ordinary care is exercised in closing the body doors promptly after each delivery.

The Hasselbeck body, with an inside length of 10 ft., an inside width of 5 ft. 6 in., and a height of 5 ft., has a volumetric capacity of 275 cu. ft., less the space taken up by the ice bunker, the shelf, and the two rear wheel housings. With a net body volume of approximately 225 cu. ft. and the use of the 150 lb. ice bunker with occasional operation of the small electric fan in the bunker to circulate the cold air, no interior division was considered necessary to maintain the temperature of the goods at not over 60 deg. F. at the end of the routes on even the hottest days.

The water ice bunker is located in the upper left front corner and is filled from inside the body through the right-side door. It has a capacity of 150 lb. of water ice—half of one regulation-size cake.

AS SHOWN in the illustrations, a wood slat shelf 15 in. wide extends along the left side of the body from the rear to within a few inches of the ice bunker. This shelf is used to carry small packages off the floor of the body, within easy reach. Heavier and larger packages are piled directly on the body floor.

The bodies were built by FitzGibbon & Crisp, Inc., Trenton, N. J. and the bunker is that company's Icefin design. The body is insulated with 3 in. of kapoc in sides and ends. 5½ in. of kapoc in roof, and 2 in. of cork in floor. The roof is Galvaneal metal with formed aluminum ends.

The interior is lined with 22 gage galvanized sheet on the sides and roof. The floor is of 14 gage Diamondette steel, selected for its long-wearing qualities. Piano-type hinges are used on doors instead of flat hinges, in order to interfere as little as possible with body lettering. The door-locking mechanism is of the three point support type with two supports inside and the door handle outside. All outside hardware is chromium plated.

The body is mounted on a standard Ford V-8 truck chassis with a 157-in. wheelbase and balloon tires all around, 6.00x20 in front and 6.50x20 duals in rear. A D64 power unit BK booster brake is fitted for easier brake operation.

Practical Problems of
TRUCK TRANSPORTATION

DISCUSSED BY EXECUTIVES IN THE FOOD INDUSTRIES

What are the best methods for reducing truck accidents?

Question No. 13

1. What fundamental practices have you found essential in reducing truck accidents?

2. Do safety committees, company traffic courts, or safety contests with buttons or cash prizes really help to reduce accidents?

3. Does it pay to give drivers who have had accidents time-off without pay instead of discharging them?

4. What percentage of accidents in your truck fleet has been due to mechanical failures?

5. Of what value in reducing accidents are mechanical or electrical directional signals?

Maintenance Best Safeguard

TAKING up your several questions concerning truck accident prevention in order, our experience has been as follows:

1. The best way to reduce truck accidents is to maintain the vehicles in safe condition at all times and to employ only experienced and dependable drivers.

2. We do not have safety committees or contests among our drivers, but we would consider them helpful in the operation of large fleets.

3. If an accident is caused by neglect or carelessness on the part of the driver, he should be discharged as unfit for this class of work. If the accident is not his fault, it would be unjust to penalize him at all.

4. Having maintained our equipment in good condition, we have had no accidents due to mechanical failures.

5. We are of the opinion that in some cases mechanical or electrical signals may be useful, depending on the type of truck. We are opposed, however, to all attempts to have specific types of signals specified by law for all classes of vehicles. —A. J. LUBELEY, *Chief Engineer, Anheuser-Busch, Inc., Old Bridge, N. J.*

Puts Penalty on Driver

WITH reference to reducing motor vehicle accidents, we answer your questions as follows:

1. The only method that we have ever found that is worth while considering is to put a penalty on the driver.

2. We have tried safety committees, company traffic courts, and safety contests, but with no results.

3. We also tried "time-off-without-pay" for drivers having accidents, but without satisfactory results.

4. We have no record of accidents caused by mechanical failure.

5. We have had no experience with mechanical or electrical directional signals.—S. DEBUS, *President, Debus Baking Co., Hastings, Neb.*

Drivers Pay for Second Accident

WE have been fairly fortunate with our drivers with regard to safe and cautious driving. Our accidents have all been small with no personal injuries resulting. In each instance when a driver reports an accident, a record is kept and the history is gone into thoroughly. If it is found to be the driver's fault, we absorb the cost of damages to the claimant for the first occurrence. The second offense is at the driver's own expense, if he is at fault.

Each week we hold a meeting of all drivers and salesmen, at which time we discuss various subjects pertaining to business and finish with some remarks about safe driving and courteousness while operating our units on the street. This tends to keep the men conscious of the fact that we are always interested in reducing our accident experience to a minimum.

We have found it impractical in our particular business to give men "time-off-without-pay" as punishment for frequent recurrence of accidents. If this was done, it would necessitate hiring and breaking-in another man for a temporary period at our own expense.

We have a mechanic on duty at all times and any defect that is reported is taken care of before the truck goes into service again. None of the accidents we have had has been due to faulty equipment.

Our motto is "Drive carefully, you may meet a fool."—H. E. OHM, *Route Superintendent, Bell-Brook Dairies, San Francisco, Calif.*

Drivers Should Pay

PRACTICES that are essential to the reduction of motor truck accidents include regular inspection of trucks, checking drivers with service recorders, and uniform rules applying to all drivers.

All the ideas such as safety committees, company traffic courts and safety contests can be made useful devices to impress upon the driver a sense of his responsibility and the necessity of keeping alert at all times.

We require drivers to pay for accidents, but do not believe in making them take time off without pay. If a driver has had several accidents it is better to find some other work for him to do and advise him not to follow up driving as a means of livelihood. In this connection, we believe that truck accidents would be greatly reduced if we all had an exacting system of examination.

We have no records of the percentage of accidents due to mechanical failure. Frequently a driver will blame an accident on some mechanical failure or defect; but usually the part is damaged in such a way that it is impossible to tell whether the claim is justified. Proper inspection of equipment permits very few accidents of this kind.

Next Question

QUESTION NO. 14

Which gives the best results—peddle truck routes, or separate salesmen?

1. In the distribution of food products such as fresh meats, prepared meat products, butter, eggs, cheese, poultry, ice cream, milk, bread and potato chips to retail store outlets, is it better to employ peddle truck routes on which the driver also takes the orders than to use a separate corps of salesmen to solicit the business with the truck driver simply delivering the goods? If so, why?

2. Which method provides the lowest cost per hundred pounds delivered?

3. Can the separate corps of salesmen, if provided with cars at company expense, or allowed mileage for privately-owned cars, procure sufficient additional business to offset the motor vehicle expense as compared with peddle truck routes with driver salesmen?

4. Or is a combination of both salesmen and peddle truck route driver salesmen the most desirable method of distribution?

We have no experience with directional signals.

The above information is based on our experience. You may also find interest in the experience of a Philadelphia operator, who does not want his name mentioned. He handles over 1,000 trucks in this territory, in the distribution of foods. He answers these questions as follows:

1. In assuming his duties, each driver is given a booklet containing more than 100 rules and suggestions regarding the duties and responsibilities of the driver. In case of an accident, the traffic manager sends a personal letter to the driver, calling his attention to the rule he has violated or suggestion he has disregarded.
2. No.
3. Yes.
4. 25 per cent.
5. None.—L. J. SCHUMAKER, *President, American Cone & Pretzel Co., Philadelphia, Pa.*

Best to Train Men

OUR ANSWERS to your questions on truck accident prevention follow:

1. In most cases we have an arrangement with our insurance company, but where we have not, we have a committee which determines the responsibility for truck accidents. If the employee is to blame, the committee determines whether he shall pay all or what part of the bill.
2. Announcement on the bulletin board of the 100 per cent safety men is made each six months' period. In addition, safety posters are conspicuous in the plant, garage, dressing rooms and in places where the men come in daily contact.
3. Our experience has been that it is far better to try to train the man than to discharge him. The method of having them pay for the accident and, in some cases, take a week or two weeks off without pay accomplishes the results desired. Discharge is resorted to only when all other resources have failed.
4. It is impossible to tell what percentage of accidents is due to mechanical failure, because drivers invariably resort to the alibi that there was something wrong with the truck. A very small percentage of the accidents, however, are due to mechanical failure.
5. We have had no experience with mechanical or electrical directional signals.—G. D. TURNBOW, *Protected Milk Products Co., Oakland, Calif.*

Safety Contest Important

WE have just compiled results on a special "safety always" week, recently promoted throughout our entire company. The subject, therefore, is uppermost in our minds at the present time. During this special week our company operated 2,945 vehicles 700,904 miles and our employees worked 330,314 hours, with remarkably few accidents, really only one of any moment and that was caused by the entire negligence of the other vehicle.

"Safety always" is a continuous, year-round activity with us. Every plant reports monthly and is "scored." There is keen competition for the honor of being first in this scoring.

We can answer your specific questions as follows:

1. Education of new men—teaching them how to live, work and play safely. Continuous publicity in the plants on the subject of "safety always." Stressing the positive rather than the negative side of accidents, that is, pointing out the happiness that results from being safe rather than the trouble and disaster that follow carelessness. Inter-plant competitive spirit, based on a yearly contest, with no awards other than the honor of having the best record.
2. There is no doubt that safety committees, traffic courts and contests help to reduce accidents. We employ all three extensively. Cash prizes may help, too, but we have never used them.
3. We have never tried the "time-off-without-pay" plan. Our practice is to warn habitually careless employees that their negligence may cost them their jobs. If they do not heed the warning, they are discharged no matter how satisfactory their other work may be.
4. While I cannot give you a definite figure on the percentage of accidents in the truck fleet that is due to mechanical failure, it is so small as to be almost negligible. Our equipment is carefully inspected daily. Our drivers are trained to report promptly all apparent deficiencies in equipment. We encourage them to complain about brakes, windshield wipers, lights, steering wheel alignment, etc. No truck against which a complaint has been made is allowed on the street again until it has been repaired and personally inspected by the garage superintendent.
5. We cannot answer this question from our experience. We use signal equipment to some extent, but how can one tell what accidents are avoided. There is no such thing as an accident until it happens. It seems to me that the only intelligent and useful answer to this question must come from some operator who, after operating for a number of years without mechanical signals, suddenly equipped his fleet with them and immediately discovered a drop in accident frequency.—A. A. CLARKE, *Treasurer, General Baking Co., New York, N. Y.*

VACATION TIME
WATCH OUT FOR CHILDREN!
CO-OPERATING FOR SAFETY ALWAYS
Health
Bond Bread
Happiness
Safety Always is more than a slogan. It is a prayer for protection from folly and carelessness. It is a plea for men, women and children to preserve what they possess and never can regain, if lost. It is a petition to the heedless to see that their carelessness destroys no one's life, no one's limb and no one's happiness.

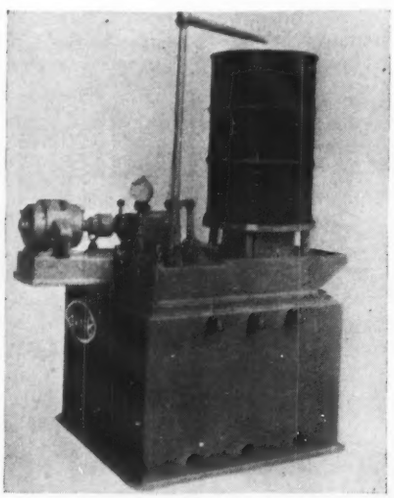
Front and back of the vehicle card used by General Baking Co., during this summer's "Safety Always Week," to reduce accidents occurring on city streets where children play.

NEW EQUIPMENT
for Food Manufacturers

Container Cleaner

RECONDITIONING and cleaning of returnable containers such as are used for shipping syrups, shortenings and other food products is the object of a new development made by Harnischfeger Corporation, Milwaukee, Wis. This machine, which is patterned somewhat upon the operation of the beer barrel cleaning equipment made by the same company, forces a hot or cold cleaning solution against the walls of the barrel by means of a revolving spray nozzle. This spray is under 50-lb. pressure and is said to dislodge all material and wash the inside of the container thoroughly before the rinsing and drying operation. The time of this spraying action can be adjusted, depending on the strength of the solution used, and from 1½ to 2 minutes' spraying time is the usual full requirement for most substances. The residue flows back to the 70-gal. pot where waste materials are removed to permit continuous pumping of the cleansing solution.

This machine handles steel barrels or other containers of various sizes, in either vertical or horizontal position. It uses any type of solvent solution and is sufficiently flexible in design to provide for various production volumes with one, two, four or multiple spindle models.



Container cleaner

Light weight hand truck

Light Truck and Skid

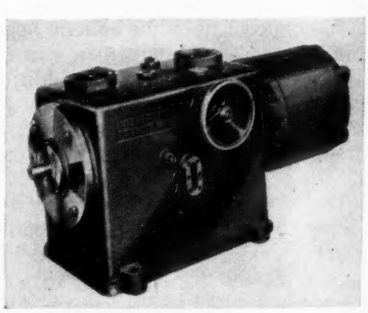
FOR USE where a light hand-lift truck is desired for loads of 1,000 lb. or less, Yale & Towne Manufacturing Co., Philadelphia, Pa., has recently placed on the market their "Zephyr" hand-lift truck and their "Featherweight" skid platform. The truck has a maximum capacity of 1,000 lb., with a frame 18 in. wide and a length of 36 to 72 in. overall. The lift is 2 in. and the ground clearance 1⅞ in. The wheels are 5½ in. in diameter by 2-in. base at rear and 5 in. in diameter by 2-in. base in front. Roller bearings are used in the wheels, and the front wheel has a ball bearing swivel caster mounting. Construction is all steel and reinforced steel plates welded between the side rails provide a deck which permits the truck to handle loads with or without the platform. The new platforms are made of oak lumber with angle iron battens, to which are attached U-shaped steel strap legs. They are 24 to 36 in. in width and 24 to 60 in. in length. These platforms can be provided with under-clearance of 6½, 7½ and 9½ in. Their construction is said to be sturdy but light, the 36-in. by 48-in. platform weighing less than 40 lb.

X-Ray Inspection Machine

INSPECTION of the product for foreign substances, after it is sealed in the package, is possible by means of the X-ray machine developed by Adrian X-Ray Manufacturing Co., 3535 N. Palmer St., Milwaukee, Wis. The machine is installed in the production line and, as products pass through it on the conveyor belt, the operator gets an interior view of each can or package. Those to be rejected are marked by the operator by means of a pointer device. Inspection for slack-filling can be done with the same machine. Another attachment permits the taking of X-ray photographs.

The machine has a voltage capacity of 150,000; but requires only a relatively small amount of current for operation. It is said to have been used to inspect as many as 7,000 oranges per hour for juice content.

X-Ray inspection machine



Hydraulic variable speed transmission

Variable Speed Transmission

ANY desired speed between 5 and 750 r.p.m. is available by means of a hydraulic variable speed transmission brought out by Vickers, Inc., Detroit, Mich. Variation is obtained by means of a handwheel on the side of the casing, and by additional adjustments speeds up to 2,500 r.p.m. are possible. Hydraulic, electrical or mechanical remote control can be substituted for manual control. Stock units are 6 hp. and 7½ hp., with larger units to be

available later. Motor can be mounted directly on frame, as shown in photo.

Speed Reducers

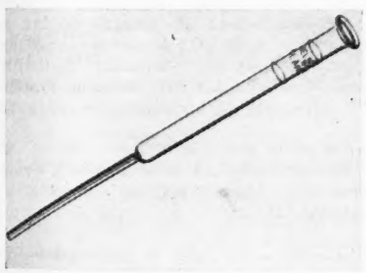
THE "Unipower" gearless reduction drive, made by Patterson Foundry & Machine Co., East Liverpool, Ohio, is now available in a complete line of horizontal units, in sizes from ¼ to 100 hp. This is in addition to the vertical units already available.

These new reducers are designed so that any standard frame size replacement motor may be installed on them in the field, and the output shafts are on centers with the motor shafts.

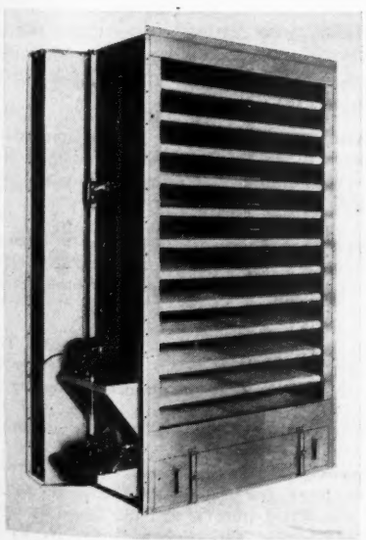
Jelly Meter

SUCCESS with jelly making is said to come from the use of "Jelmeter," made by the Jelmeter Co., Bridgeton, N. J. By its use, the correct amount of sugar to be added to any fruit juice to make a satisfactory jelly can be readily determined.

Referring to the accompanying photograph, it will be seen that the meter is a glass tube, of small diameter for about one-half its length, and of considerable larger diameter for the remainder. In operation, the opening at the small end is held closed while the tube is filled with the juice at room temperature up to the level of the upper mark on the large end. This juice is then allowed to flow out until the level reaches the lower mark, the time of flow being noted. By use of a calibration table that comes with the instrument, the amount of sugar to be added, and the amount of boiling necessary to produce the proper consistency, are read directly.



Jelly meter



Self-cleaning air filter

Self-Cleaning Air Filter

A FULLY automatic, self-cleaning, dry-type air filter, called "Dry-Matic," has been brought out by Coppus Engineering Corp., Worcester, Mass. It uses a specially-woven cotton fabric as the filter medium. When the air passes through this filter material, the dust particles are sifted out and deposited on the filter curtain. Once a day to once a week, according to the dust concentration in the air, the filter curtain starts to move slowly over a dust drawer at the bottom of the filter housing and at the same time a rotary beater is set in operation.

This cleaning may be manually operated, or by automatic time clock, as desired. Soft leather fringes beat the curtain on the clean-air side and shake off the dust into the drawer. The filter element runs in zig-zag fashion, as an endless belt, over rolls, forming horizontal, tapered pockets. Both edges of the filter curtain are reinforced cords to which are attached chains in an endless loop. On the ends of the rolls are mounted sprockets on which the chains run. To prevent bypassing of air, the edges of the curtain pass through a seal.

The makers claim that this filter is over 99.9 per cent effective for particles of 10 micron size or larger; maintains high efficiency even if neglected; and has low air resistance.

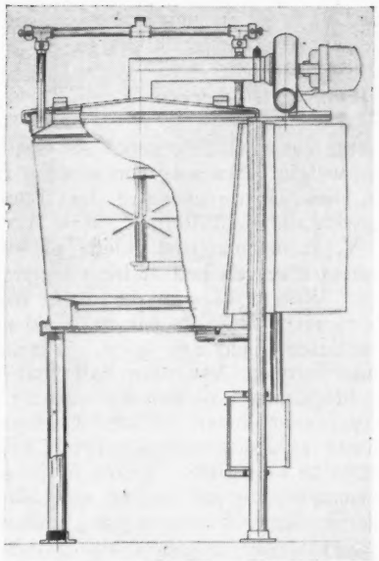
De-Larding Oven

FOR salvaging fat from barrels, Detroit Nesting-Stacking Box Co., Detroit, Mich., has developed a de-larding oven. The accompanying photograph shows a barrel about to be inverted over the heating cone of the oven. The arrangement of the device is evident from the picture. One large company is said to be using these units in thirteen of its plants and to be salvaging 1½ lb. of fat per barrel, and in addition to be receiving 10 cents extra for the delarded second-hand barrels.

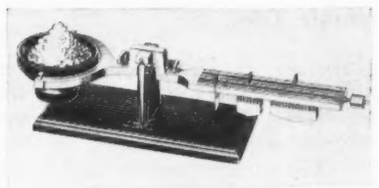
Small Milk Irradiator

TO PERMIT the smaller dairies to produce irradiated milk, Creamery Package Manufacturing Co., Chicago, Ill., is distributing their "Junior" milk irradiator. This device has half the capacity and costs approximately half as much as the 4,000-lb.-per hour irradiator previously developed by this company.

The machine uses a carbon arc lamp designed particularly for this purpose, with its operating parts mounted outside the conical irradiating cylinder. In operation, the carbon lamp is within the thin, cylindrical film of milk, which flows past at the correct speed to give desired irradiation.



Small milk irradiator



Chemical balance

Simplex de-larding oven

Chemical Balance

A LOW-PRICE scale that is said to be accurate to one-hundredth of a gram, called the "Bennett Balance," has been brought out by Chemical Publishing Co., 175 Fifth Ave., New York, N. Y. This balance is made of light alloy metal and has a black molded plastic

base. It is 12 in. long and 2½ in. high. The capacity is up to 100 grams.

Refractory Concrete

A NEW TYPE of "Firecrete," for casting light-weight refractory concrete on the job, has been developed by Johns-Manville, 22 East 40th St., New York, N. Y. It is composed chiefly of high alumina clay calcined at high temperature. Weight of concrete made from this material is 75 lb. per cu.ft., 40 per cent lighter than fire brick. Thermal conductivity is less than half that of fire brick, and heat storage capacity is 40 per cent lower. Under continued heating at 2,400 deg. F. shrinkage is said to be negligible. Tested by severe alternate heating and cooling, no spalling was reported. Furnace parts and refractory shapes cast from this material can be placed in service after 12 to 24 hours of air-curing.

Portable Tool

COMBINING an electric hammer and drill, Wodack Electric Tool Corp., 4627 West Huron St., Chicago, Ill., recently introduced a new tool called the "Do-All." The hammer can be used to drill holes in concrete or masonry up to 1⅜ in. diameter, and for chipping, chiseling, cutting and vibrating.

By a simple adjustment, the drilling attachment is put in place. This has a capacity of ⅜ in. in metal, and can also be used as a portable grinder and buffer. Among other uses for the new tool, the manufacturers recommend it for installing expansion bolts and similar concrete fastenings.

Humidity Controller

CONTROL of humidity and air purity is the object of the "Calorider," manufactured by Research Corporation, 405 Lexington Ave., New York, N. Y. This is an enclosed apparatus through which the air to be treated is passed. Humidifying is accomplished by means of sheets of fresh, tempered water. Dehumidifying is by passing the air through moisture-absorbing "Caloride." The device also washes, filters, distributes and circulates the air.

The "Calorider" units operate with two ¼ hp. motors and cost about 5 cents per day to operate, for water and electricity.

Colored Valve Wheels

IDENTIFICATION of valves is the object of a new colored, molded-plastic valve wheel developed by Jenkins Bros., 80 White St., New York, N. Y. Five standard colors are offered—blue, red, black, green and gray—unmarked; also, five standard designations, such as "water," molded in relief. Special colors and markings can also be obtained.

The Manufacturers Offer . . .

Knife Switches—Types LP-1 and LP-Y1 knife switches form the subject of bulletin GEA-2127, issued by General Electric Co., Schenectady, N. Y.

Metal Furniture—Leaflets recently issued by Angle Steel Stool Co., Plainwell, Mich., discuss steel cabinets, stools, chairs, desks, tables and work benches.

Nickel and Monel—Two new bulletins, C-1 and H-1, discuss the use of nickel and monel metal in soap manufacturing equipment and Monel metal in pumps.

Controller Valves—Diaphragm valves for use in control systems, as made by C. J. Tagliabue Mfg. Co., Park and Nostrand Ave., Brooklyn, N. Y., are the subject of bulletin No. 1117.

Food Colors—Certified colors, "Red Seal" brand, made by Warner-Jenkinson Mfg. Co., St. Louis, Mo., are discussed in a recent booklet.

Reciprocating Pumps—Bulletin W-102-D1, of Worthington Pump & Machinery Corp., Harrison, N. J., describes horizontal duplex piston pumps, Type TB, turret type, for handling liquids at pressures up to 200 lb. per sq.in.

Electro Meter—The Allison Electrometer, for determining pH values, for potentiometer titrations, for thermocouple pyrometer tests and similar laboratory determinations, is the subject of a folder issued by Chemical and Research Corp., Beverly Hills, Calif.

Cans—"Pouring Ideas Into Tin Cans," a reprint of an article by Arthur Pound, appearing in Atlantic Monthly, May, 1935, is offered by Continental Can Co., 100 East 42nd St., New York, N. Y.

Laboratory Equipment—Manufactured by Laboratory Construction Co., Kansas City, Mo., including Kjeldahl apparatus, gas burners and electric heaters, are discussed in recent leaflets.

Pyrometer Records—In color and number, records obtained from Foxboro pyrometers are the subject of a pamphlet issued by the Foxboro Co., Foxboro, Mass.

Dairy Equipment—The Mortensen line of equipment for pasteurization of milk and other dairy purposes is described in loose-leaf catalog issued by Standard Milk Machinery Co., Louisville, Ky.

Package Design—"Modern Box Design," a loose-leaf catalog, published by Hinde & Dauch Paper Co., Sandusky, Ohio, deals with the outward appearance of corrugated fiber shipping boxes.

Storage-Battery Trucks—For delivery of foods and other products electric storage battery trucks are discussed in a recent booklet published by Electric Storage Battery Co., Alleghany Ave. and 19th St., Philadelphia, Pa.

Portable Conveyors—Of the belt type, portable conveyors for handling loose or bagged bulk materials, are the subject of folder No. 1414, issued by Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill.

Ball-Bearings—Tenth edition of the complete catalog of ball bearings made by New Departure Co., Bristol, Conn., 144 pages, is now available.

Laboratory Aspirator—For cleaning samples of wheat, barley, rice and similar products, the Bates laboratory aspirator is described in a folder by Ricetown Sample Devices Co., Stuttgart, Ark.

Boiler—Design VM, C-E Bent Tube boilers for power plants are described in a recent bulletin of Combustion Engineering Co., 200 Madison Ave., New York, N. Y.

Tight Wrapper—Stokes & Smith Co., 4917 Summerdale Ave., Philadelphia, Pa., describes the S.&S. tight wrapper for packaging in a recent bulletin.

Bentonite—Wyoming bentonite and its industrial uses are discussed in a series of technical bulletins issued by American Colloid Co., 363 West Superior St., Chicago, Ill.

Lubrication Equipment—A revised, 25 page catalog of "Powergun" lubricating equipment is announced by Alemite Division, Stewart-Warner Corp., 1826 Diversey Parkway, Chicago, Ill.

Pumps and Compressors—Several new bulletins of Worthington Pump and Machinery Corp., Harrison, N. J., are announced, as follows: Air compressor units, types VS and VA2; Surface condensers of welded steel construction; Horizontal duplex piston pumps, types PC; Monobloc centrifugal pumps, group D; Vertical centrifugal pumps, type F; Air lift pumping systems; Vertical single air compressors, type VS.

Shaker—For shaking screens, sieves, etc., the Shaler shaker is described in a bulletin issued by Ajax Flexible Coupling Co., Westfield, N. J.

Air Conditioning and Refrigeration—New Freon condensing units and horizontal type air conditioners are described in a series of leaflets issued by York Ice Machinery Co., York, Pa.

Valves—Disk and plug type globe and angle valves of bronze are the subject of a recent folder of Fairbanks Co., Binghamton, N. Y.

Mixing Equipment—For liquids and solids, mixers made by Patterson Foundry & Machine Co., East Liverpool, Ohio, are pictured in a recent folder.

Microscope Accessories—A new 64-page illustrated catalog of microscope accessories has been issued by Bausch & Lomb Optical Co., Rochester, N. Y.

Tire Health—"Twelve Rules for Tire Health" is the subject of an article by K. D. Smith, now being distributed by B. F. Goodrich Co., Akron, Ohio, and reprinted from American Legion Monthly.

Improving Power Factor—G-E Pyranol capacitors, for improving the power factor of industrial plants, are discussed by General Electric Co., Schenectady, N. Y., in bulletin GEA-77H.

IDEAS
from Practical Men

Sluice System Eliminates Conveyors

THE maintenance and cleaning incidental to conveyor operation in canning plants is usually a major operating problem. Unless extremely close attention is given them, conveyors often break down when needed the most, causing delay and waste of material.

To eliminate these troubles, a large Mid-Western pea cannery recently installed a sluice system to handle peas between the picking tables and the blanchers. Sheet metal troughs sloping toward the blancher inlet, with removable covers to facilitate cleaning, were erected.

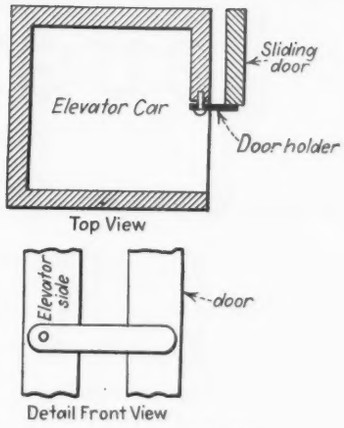
Peas from the hoppers at the end of the picking tables on the second floor of the factory building enter the upper end of the troughs. Hot water pumped from the blanchers by centrifugal pumps belted to the blancher lineshaft serves as the conveying medium.

In addition to the flexibility and trouble free operation of this equipment, the preheating of the peas before entering the blanchers has improved temperature control, with a resulting improvement in the overall performance of the blanching process. —SAMUEL HENRY, *Sandusky, Ohio.*

To Hold Elevator Door Open

IN AN establishment where there are a number of freight elevators, the operators must at times leave the car. On all such occasions it was necessary to hold the elevator door open and various means were adopted for that purpose, such as a box in the doorway, a screw driver wedged under the door, etc.

The problem was finally solved as illustrated herewith. With the use of this attachment, there is no danger of the door being left open when the car is moved, as was the case with the previous expedients, because if the operator forgets to release the door, it will be automatically released when the car is moved in either direction. The piece that holds the door is made of hardwood, which has sufficient strength to hold the door, but will easily break in case it interferes with the car when in motion.—N. T. PEF, *Chicago, Ill.*



Elevator door holder.

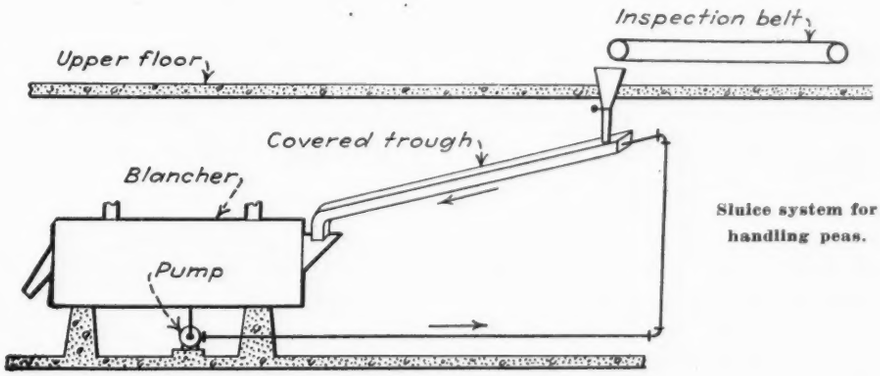
Booster Pump Supplies Water for Clean-up

WHEN washing down certain types of food processing machinery preliminary to sterilization with steam, high water velocities are very advantageous. Jets of water at relatively high pressure are of great value in removing bacteria-breeding particles from the hard-to-reach cracks and corners.

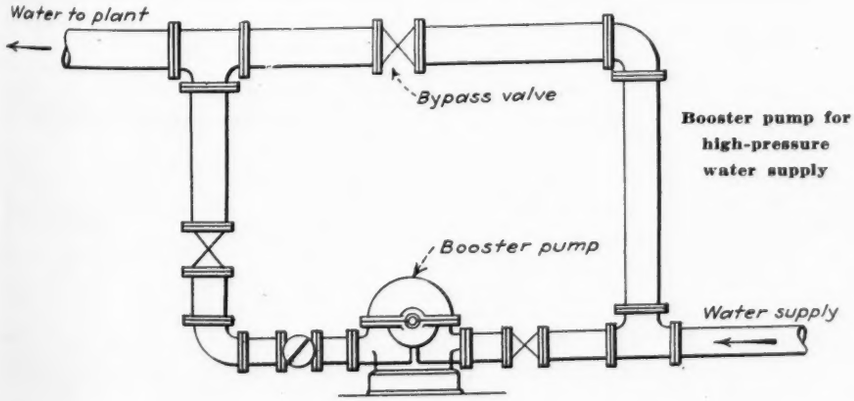
In many cases, the high velocity of the steam used in sterilizing will perform this function. Some types of machinery, however, among which may be cited the equipment used in canning corn, require a thorough washing before sterilizing. The tendency of live steam to bake starchy waste material to the metal of corn processing machinery renders the removal of this material by water a necessity.

Where the pressure in the water system is not sufficiently high, a booster pump arranged to increase the pressure during clean-up periods will often prove economical. Such an installation used in a large canning plant is shown in the sketch reproduced at the left.

To effect a power saving the pump is normally by-passed and is put in service only when high pressure clean-up water is required, the normal pressure in the water system being sufficient for all other purposes.—S. H. COLEMAN, *Waynesboro, Va.*



Sluice system for handling peas.



Booster pump for high-pressure water supply

BUSINESS TRENDS

More Canning Acreage

FURTHER increases in the acreages devoted to canning crops this year are forecast in recent reports of the Bureau of Agricultural Economics. Sweet corn acreage is placed at 403,260, 25 per cent above 1934 and the highest since 1930. Tomatoes, 13.2 per cent above 1934, at 488,210 acres are the highest on record. Cucumbers for pickles are forecast at 100,940 acres, 12.8 per cent above last year, and the highest since 1930. Beet acreage for canning is estimated to be 8,480, compared to 7,840 last year and 10,780 in 1930. Lima bean planting is indicated at 28,970 acres, up 14.7 per cent and cabbage for kraut is off 26.7 per cent from 1934 to 18,890 acres.

While weather conditions have delayed crops, primarily because of too much moisture, a better than normal yield is still forecast. Combined with the high acreages planted, a production of canned vegetables far higher than in recent years is still in prospect, despite what has happened to late peas.

Larger Canning Crops

EARLIER predictions of extra large crops, and consequent packs, of many of the important canned foods, are borne out by the reports available as of Aug. 15, from the Bureau of Agricultural Economics. The pea pack seems certain to exceed 22,000,000 cases, and may approach the 25,000,000 cases predicted earlier in the season. This compares with an average of about 17,000,000 cases output in recent years.

Based on the Aug. 1 condition of the crops, a total production of snap beans of 81,690 tons is expected, compared to the five year average of 71,000 tons. Sweet corn is expected to yield 916,140 tons compared to the five year average of 587,000 tons. Tomatoes are expected to yield 2,040,370 tons, 53 per cent over the five year average.

Most minor canning crops also promise good yields, including kraut, beets and cucumbers, all above the five year average. One exception is noted in lima beans, the condition of which is reported as 79.5 per cent of normal on Aug. 1, compared to 84.9 per cent of normal at the same period last year.

Canned Food Stocks Decrease

JULY 1 reports of the Department of Commerce showed stocks of seven principal canned foods in wholesale distributors' hands to be slightly below the quantity reported for July 1, 1934. The figures were 3,413,976 cases compared to 3,563,880 cases last year.

The breakdown of these figures showed more peaches and pears in stock: 485,608 cases of peaches on hand July 1, 1935 compared to 415,266 cases last year; and 206,219 cases of pears compared to 171,763 cases in 1934. Stocks of peas, tomatoes, green and wax beans, and pineapple were about the same as a year ago. Corn at 526,425 cases was 30 per cent below the 756,821 cases recorded in 1934.

These figures indicate that the stocks reported on Jan. 1 of this year have largely moved out of distributors' hands and that the carry-over facing the new pack is somewhat less than that of previous years.

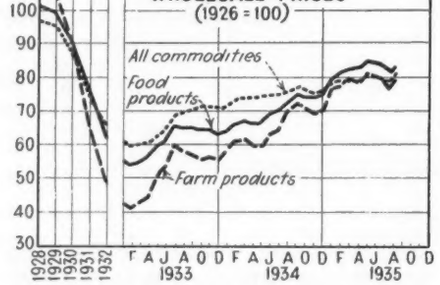
Canned Food Exports Up

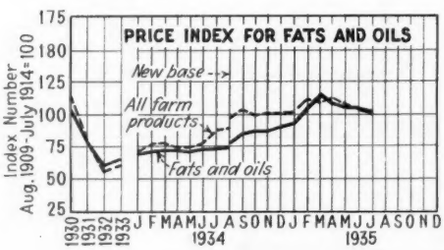
INCREASES are reported by the Department of Commerce in the exports of a number of canned foods in June, 1935, as compared to the same month of the preceding year. Exports of canned vegetables almost doubled, with a total of 5,045,167 lb. as against 2,891,581 in 1934. The outstanding item in the vegetable list was asparagus, which increased from 1,924,181 lb. to 3,938,607 lb.

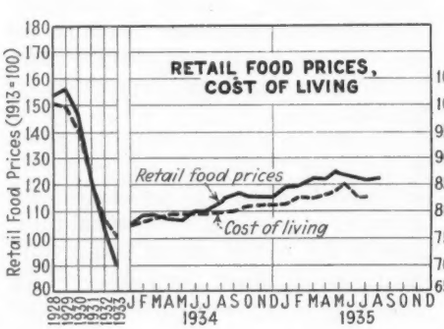
Canned fruits also registered a notable increase, the quantity rising from 12,026,812 lb. to 16,766,952 lb. Most of this increase seems to have been in exports of canned pears, which increase from 1,025,741 lb. to 5,095,019 lb. A considerable decrease was noted in exports of canned grapefruit.

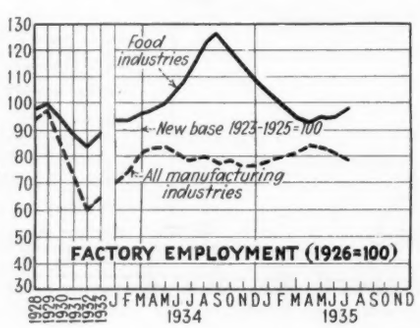
Canned fish exports also increased, with the total advancing to 4,975,896 lb. from the 3,824,386 lb. sent out the year before. This last increase was all accounted for by sardines, the export of which increased from 1,519,593 lb. to 2,829,549 lb.

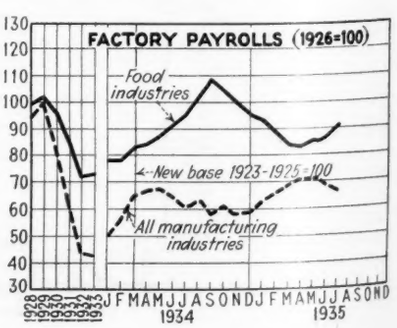
More active trading in canned foods, as indicated by the figures given, is another evidence of awakening in the export market. While this advance has been notable in some products, as automobiles and machine tools, it has not been felt as much in the food industries because of the world surpluses hanging over the export market of so many foods, such as the grains and dairy products, both of which have also been in reduced supply in the United States. Another branch of the food industry that is also experiencing an improved export market is sugar refining, increases in the export of refined sugar having been noted in these columns several times this year.











Business on the Up

IN THE FACE of questionable legislation, threats of war, rising commodity prices, and a disturbing summer season, general business conditions have been steadily improving during the past month. Indications look good for this improvement to continue. Capital goods, automotive and metal working industries are all busy, even though factory employment has declined. General tone of business conditions is evidenced by the continued upward trend of the *Business Week* index of business activity. For the week ending Aug. 17, it stood at 66.9 per cent of normal, a betterment of 3.89 per cent in a four weeks period, and the highest it has been on that date since 1931.

U. S. Department of Labor reports a sustained and continued upturn in wholesale prices. All commodities have risen 1.77 per cent during the month ending Aug. 17; farm products rose 4.02 per cent; and foods are 4.15 per cent higher. The price index of the New York *Journal of Commerce* has not been so consistently upward, but for the four weeks period ending Aug. 17 the general index has had a net rise of 1.52 per cent; grains, 2.06 per cent; and foods 8.35 per cent.

Wheat Crop Below Consumption

FOR the third consecutive year, the United States' wheat crop is expected to be below the domestic consumption. Black rust, more serious in its effects than was at first thought to be the case, is chiefly responsible for a cut in the estimate of the crop total, given out by the Bureau of Agricultural Economics, to 607,678,000 bu., as of Aug. 1. Normal domestic utilization runs from 625,000,000 to 650,000,000 bu.

No shortage of wheat is to be expected from this low output, however. The carry-over, which long hung over the market and depressed prices, will be reduced well below normal size, but will be ample to provide the total needed. Short supplies will, however, tend to make the price firm, and consequently some wheat may come in from countries which produce at a lower cost. This may not be great in quantity, however, as wheat production is also curtailed in other surplus producing countries and the world price is also increasing. So far, only a small quantity of wheat has been brought in this year, the amount being reduced by the fact that the import of wheat as animal feed is no longer necessary with the passing of the effects of last year's drought on stocks of animal feeds.

Total apparent supplies of wheat in the United States, after this year's harvest is added to the carry-over, are expected to be 758,000,000 bu., which should insure a carry-over into the next crop year of more than 100,000,000 bu.

Wine Prospects Better

A 50,000,000 GAL. wine production is forecast for California this year, on the basis of estimates gathered from vintners by G. G. Pearce for the Wine Institute. This would be more wine than was produced by that state in any of the seven years immediately preceding prohibition. The membership of the Institute, confined to California growers, accounts for about 80 per cent of the wine production of the United States. On this basis, a total production exceeding 60,000,000 gal. may be looked for this year, about 8 to 10 per cent above the best previous record.

Greater wine consumption is also forecast by Mr. Pearce, who looks for a total consumption in the United States of 36,000,000 gal., a 44-per cent increase over the consumption of 1934. Of this, 98 per cent is likely to be the product of California and other wine producing states, the remainder being imported. Four states, with one-fourth of the nation's population, are expected to account for 80 per cent of this consumption; but, with the liberalized laws now in effect in some of the other states, the demand is expected to improve in other quarters.

Construction News

	Pending (thousands)	Awarded August (thousands)	Total Awarded 1935 (thousands)
Bakery	$95	$56	$341
Beverages	1,867	251	3,403
Canning and Preserving	80	100	868
Confectionery	.....	.....	28
Grain Mill Products	258	295	1,311
Ice Manufactured	66	100	459
Meats and Meat Products	158	45	1,876
Milk Products	451	56	1,250
Miscellaneous	278	296	3,123
Total	$3,253	$1,199	$12,659

INDICATORS

WINTER VEGETABLES imported from the west coast of Mexico into the United States during the season 1934-1935 increased more than 100 per cent over the imports of the preceding year.

SOUR CHERRY PRODUCTION this year was 8 per cent above the average and cherry pie fans are all ready for an interesting winter.

APPLE PRODUCTION in better than average amount is expected this year, after three years of light yield.

ASPARAGUS pack in 1935 totaled 2,519,588 cases, all sizes, made up of 1,654,781 cases of regular and 864,777 cases of all green; this compares to a 1934 total of 2,148,891 cases, made up of 1,280,825 of regular and 868,066 of all green.

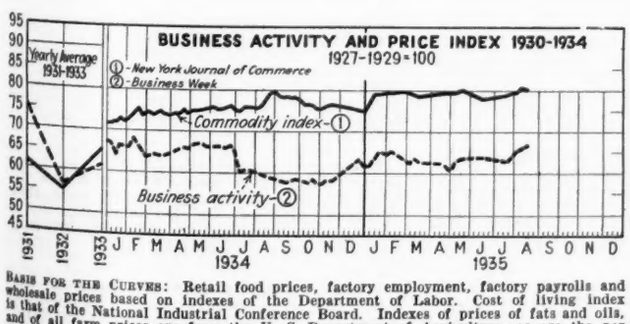
WINE consumption in the United States is forecast at 0.286 gal. per capita in 1935, compared to 0.198 gal. per capita last year.

MARGARINE production during the first seven months of 1935 totaled 221,225,255 lb., 88.7 per cent over 1934.

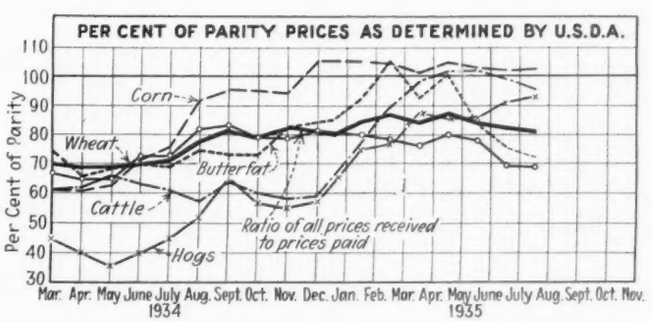
MARGARINE production for July, 1935, at 17,845,880 lb., was only 12.6 per cent over July, 1934, showing a relative decrease in activity paralleled by falling butter prices.

BUTTER in storage in the United States on Aug. 1 was 149,464,000 lb., the third largest total ever recorded, and 40,716,000 lb. above 1934.

WHOLESALE PRICES, in the third week of August, were at the highest point reached since November, 1930, mostly because of the continued increase in the prices of food and farm products, according to the Bureau of Labor Statistics.



BASIS FOR THE CURVES: Retail food prices, factory employment, factory payrolls and wholesale prices based on indexes of the Department of Labor. Cost of living index is that of the National Industrial Conference Board. Indexes of prices of fats and oils, and of all farm prices are from the U. S. Department of Agriculture, as are the per cent of parity prices.


PER CENT OF PARITY PRICES AS DETERMINED BY U.S.D.A.
Per Cent of Parity
Corn
Wheat
Butterfat
Cattle
Hogs
Ratio of all prices received to prices paid
Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov.
1934
1935

PATENTS

Shredded Foods Such as Tubers Dehydrated by Suspension in Column of Drying Gas During Passage From Lower to Upper Levels of Treating Chamber—David D. Peebles, Eureka, Calif. No. 2,005,238. June 18, 1935.

Ice Cream Sundae in Package Form by Placing Topping in Container With Removable Bottom Previous to Deposition of Ice Cream—Russell Stover, Kansas City, Mo. No. 2,005,245. June 18, 1935.

Flour Baking Qualities Improved Through Addition of Chlorinated Nitrogen Compounds Containing Alkyl Radical Groups — Rudolf Rüter, Cologne-Deutz, Germany. No. 2,005,268. June 18, 1935.

Boiled Sugar From a Continuous Cooker Cooled in a Continuous Manner on a Rotary Water Jacketed Plate of Shallow Truncated Conical Form Having a Central Discharge Orifice — Edward Metchalfe-Shaw, Chiswick, London, England. No. 2,005,271. June 18, 1935.

Fruit and Vegetable Juice Supplied to Cans by Machines Having a Rotatable Feed Tank — Stefano Pittaluga, San Leandro, Calif. No. 2,005,471. June 18, 1935.

Method of Making a Soluble Dried Casein —Henry V. Dunham, Bainbridge, N. Y. No. 2,005,730. June 25, 1935.

Natural and Added Color in Citrus Beverage Preserved by Adding Quinoid Compound—Ralph H. Higby, Ontario, Calif., to California Fruit Growers Exchange Los Angeles, Calif. No. 2,005,786. June 25, 1935.

Means for Heat-Treating Cheese—Norman Kraft, Wilmette, Ill., to Kraft-Phenix Cheese Corp., Chicago, Ill. No. 2,005,996. June 25, 1935.

Peeled Potatoes Partially Cooked Without Destruction of the Cell Structure by Treatment With Steam—George P. Miller, Naperville, Ill. No. 2,006,146. June 25, 1935.

Method and Means of Forming Wrapped Ice Cream Bars—Clarence W. Vogt to Vogt Processes, Inc., Louisville, Ky. Nos. 2,006,375 and 2,006,376. July 2, 1935.

Milk Delivered to a Plurality of Milk Cans From a Common Source by Use of Vacuum—Cyrus Howard Hapgood, Nutley, N. J., to the DeLaval Separator Co., New York, N. Y. No. 2,006,393. July 2, 1935.

Mechanical Means for Decorating Chocolate Coated Confections — Alonzo Linton Bausman to National Equipment Co., Springfield, Mass. No. 2,006,432. July 2, 1935.

Fats Subjected to Counter-Current of Steam Under Sub-atmospheric Pressure to Distil Higher Fatty Acid Content—Lucius M. Tolman to New Process Fats Refining Corp., Chicago, Ill. No. 2,006,491. July 2, 1935.

Vitamins B and G Separated From Casein in Milk by Precipitation of the Casein at pH of Approximately 4.5 to 4.7 and Subsequently by Keeping the pH to Less Than 7 and Heating the Solution — George C. Supplee and George E. Flanigan, Bainbridge, N. Y., to The Borden Co., New York, N. Y. No. 2,006,699. July 2, 1935.

Finely-Divided Vitamin-Free Casein Precipitated From Milk at Isolectric Point Then Treated in a Solution of Highly Ionized Salt With Subsequent Adjustment of the pH Value—George C. Supplee, George E. Flanigan and Raymond C. Bender, Bainbridge, N. Y., to The Borden Co., New York, N. Y. No. 2,006,700. July 2, 1935.

Substantially Dry Margarine Made by Adding to the Churn Mixture a Relatively Small Proportion of High Molecular Weight Fatty Acid Ester of Glycerine Containing More Than One Free Hydroxy Group.—Albert Kuba Epstein, Marvin C. Reynolds and Benjamin R. Harris, Chicago, Ill. No. 2,006,798. July 2, 1935.

Dried Egg Whites With Improved Foaming Characteristics by Treatment at Temperatures Above 80 deg. C. for a Considerable Length of Time—Albert K. Epstein, Benjamin R. Harris, Marvin C. Reynolds and Woldemar M. Sternberg, Chicago, Ill. No. 2,006,799. July 2, 1935.

Fluidity of Cheese Increased by Agitation and Heat Treatment While Being Forced Through a Unit Operating in the Vertical Plane—Ernst Sutter, Berthoud, Switzerland. No. 2,006,876. July 2, 1935.

Hot Biscuit-Cooled on a Band Conveyor by Jets of Cooled Air Directed Against Underside of Conveyor—Frederick Haug, Stuttgart-Munster, Germany, to Baker-Perkins Co., Inc., Saginaw, Mich. No. 2,006,919. July 2, 1935.

Fresh Fruit Given a Thin Protective Coating of a Waxy Material in an Oily Vehicle Before and After Shipment—Ernest M. Brogden to Brogdex Company, Winter Haven, Fla. No. 2,007,177. July 9, 1935.

Eggs Candled and Graded by a Photoelectric Device—Raymond R. Haugh to Kraft Egg Machine Co., Chicago, Ill. Nos. 2,007,195 and 2,007,196. July 9, 1935.

Emulsified Food Products Stabilized by Use of Locust Bean Gum, Purified Irish Moss and Gum Karaya—William Seltzer, Passaic, N. J., to Kraft Phoenix Cheese Corp., Chicago, Ill. No. 2,007,218. July 9, 1935.

Coffee Beans Steamed and Extracted With an Organic Solvent For Removal of Caffeine—Frans Marinus Meijer to Wilhelmus Henricus Levett, Amsterdam, Netherlands. No. 2,007,405. July 9, 1935.

Two-Piece Curd Cutter With Combined Width Greater Than the Entire Width of the Curd Contained in Vat—Edward C. Damrow, Fond du Lac, Wis. No. 2,007,422. July 9, 1935.

Cooling System for Bread Wrapping Machine—Clay F. Barritt to George Rushton Baking Co., Wichita, Kan. No. 2,007,439. July 9, 1935.

Method of Making Filled Ice Cream Blocks—Henry G. Jancsy, Everett, Mass. No. 2,007,572. July 9, 1935.

Vitamin D Produced in Food Products Exposed to Action of Cathode Rays — Arthur Knudson, Albany, N. Y., to Sun-A-Sured, Inc., Chicago, Ill. No. 2,007,765. July 9, 1935.

Casein Separated From Soya Meal—David M. Burruss, Jr., St. Louis, Mo., and John P. Collinsville, Ill., to Chemical & Pigment Co., Inc., Collinsville, Ill. No. 2,077,962. July 16, 1935.

Levulose Crystallized From Syrup Containing From 87 to 93 Per Cent Solids—Richard F. Jackson, Chevy Chase, Md. No. 2,007,971. July 16, 1935.

Shredded Cereal Biscuit Type of Cereal Product—Kenneth D. Loose, Bronxville, N. Y., to Loose-Wiles Biscuit Co., Long Island City, N. Y. No. 2,008,024. July 16, 1935.

Portable Unit for Sampling, Grinding, and Test Brewing Coffee—Edward S. Douglass, Chicago, Ill., to Jules A. Schlinger, Connellsville, Pa. No. 2,008,065. July 16, 1935.

Gelatin Dessert Put into Desired Physical Form by Compression Units—Charles T. Walter and Joseph Bech, to Swift & Co., Chicago, Ill. No. 2,008,428. July 16, 1935.

Nutrient Medium for Yeast Growing From Treated Waste Distillery Slop—Harold L. King, Bloomfield, N. Y., to the National Grain, Yeast Corp., Belleville, N. J. No. 2,008,584. July 16, 1935.

Pectin-Containing Materials Digested in Strong Inorganic Acids at About 60 Deg. C to Aid in Extracting Pectin From Aqueous Solution Having a pH Between 0.7 and 2.2—Leo Wallerstein to Wallerstein Co., Inc., New York, N. Y. No. 2,008,999. July 23, 1935.

Semi-Fluid Fish Paste Sprayed Dried by Falling Through Column of Heated Air—William P. M. Grelck, Baltimore, Md. No. 2,009,134. July 23, 1935.

Milk Heat-Treated to Form Semi-Fluid Acid Milk Product Relatively Free From Non-Coagulated Albumin and Casein—William P. M. Grelck, Baltimore, Md. No. 2,009,135. July 23, 1935.

Semi-Fluid Acid Milk Given Butter Consistency and Cheese Flavor by Addition of Cured Cheese During Heat Treatment—William P. M. Grelck, Baltimore, Md. No. 2,009,136. July 23, 1935.

Cheese Emusified at Below-Pasteuration Temperatures—Clinton H. Parsons to Swift & Co., Chicago, Ill. No. 2,009,233. July 23, 1935.

Bran in the Ratio of 1 to 3 Parts of Water Heated From 90 to 180 Deg. C. for 5 min. Dried and Milled Preparatory to Mixing in Bread-Making Dough—Carl Gerhard Quaschning and Heinrich Hundertmark, to "Deback" Deutsche Backmittel Gesellschaft mit beschränkter Haftung, Hamburg, Germany. No. 2,009,274. July 23, 1935.

Coffee Flaked and Sealed in Metal Container in Atmosphere of Inert Gas—Ronald B. McKinnis, Pittsburgh, Pa., to Continental Can Co., New York, N. Y. No. 2,009,321. July 23, 1935.

Ground Meat Extracted by Attrition Grinding With Water Freed From Unground Connective Tissue And Dried to Give a Finely Divided Meat Protein—Elton R. Darling, Chicago, Ill. to Chappel Bros., Inc., Rockford, Ill. No. 2,009,391. July 1, 1935.

Arabanose in Low Percentage Added to Dough Batch to Retard Staling of Yeast-Leaven Bread—Albert K. Epstein and Benjamin R. Harris, Chicago, Ill. No. 2,009,440. July 30, 1935.

Sugar Cane Bagasse Treated With Alkaline Digestion For Recovery of Sugar-Cane Wax—Miguel A. Rosales, Bais Oriental Negros, Philippine Islands. No. 2,009,522. July 30, 1935.

Original Color, Appearance and Condition of Freshly Cut Meat Retained by Treatment With Fabric of Open Texture and a Congealable Solution Containing an Essential Oil With Germicidal Properties —Levi Scott Paddock and Richard W. Regensburger to Industrial Patents Corp., Chicago, Ill. No. 2,009,587. July 30, 1935.

Dry Powdered Pectin Mixture for Making Jellied Candies and Confections—Powell Williams, Kansas City, Mo. and John E. Waugh, St. Louis, Mo., to Speas Manufacturing Co., Kansas City, Mo. No. 2,010,340. Aug. 6, 1935.

Method for Obtaining Milk Colloids From Liquid Milk—Byron H. Webb, Washington, D. C., to the free use of the public. No. 2,010,573. Aug. 6, 1935.

Coffee, Nuts and Beans Roasted Under Automatic Control—William G. Burns, New York, N. Y., and Richard A. Greene, Brooklyn, N Y., to Jabez Burns & Sons, Inc., New York, N. Y. No. 2,010,582. Aug. 6, 1935.

Hulling of Nuts Aided by Subjecting Nuts to Ethylene Gas in Gas Tight Compartments—Edward M. Chace, Los Angeles, Daniel G. Sorber, El Monte, David H. Rundle, Whittier and Marston A. Kimball, Alhambra, Calif., to the free use of the public of the United States of America. No. 2,010,780. Aug. 6, 1935.

Theine-Free Tea Made by Extraction With Theine Solvent and Subsequent Heating to Not More Than 65 Deg. C. With Water Vapor—Theodor Grethe, Hamburg, Germany. No. 2,010,919. Aug. 13, 1935.

Pineapple Heated at High Pressure Under Controlled Release Resulting in the Explusion of Air and Disruptive Vaporization of Moisture Preliminary to Syrupping For Canning—Robert Brooks Taylor, to Hawaiian Canneries Company, Ltd., Kapaa, Kauai, Hawaii. No. 2,010,020. Aug. 13, 1935.

Untoasted Cereal Flakes Made by Forming Dough At a Temperature Below 212 Deg. F. and Forming Dough Into Grits Without Boiling or Baking—Lincoln S. Greenwood, one-half to John H. Newman, Rochester, N. Y. No. 2,010,050. Aug. 13, 1935.

Rapid Maturing and Ripening of Beer With Bacillus Subtilis and Fungus Enzymes—Leo Wallerstein, New York, N. Y. No. 2,011,095 and 2,011,096. Aug. 13, 1935.

Things Have Happened

- *Congress legislates legality into Adjustment Act*
- *Copeland Bill again fails to reach finish line*
- *AAA strengthens position in processing tax fight*
- *FTC gets permission to dissect food industries*
- *Government takes live chicken industry in hand*

AAA Amendments Pass

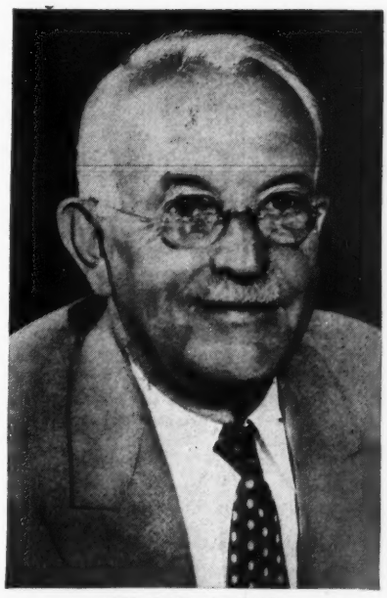
AFTER a long, uphill journey, the bill amending the Agricultural Adjustment Act was put through by Congress in its pre-adjournment cleanup of "must" legislation. Both houses adopted the conference report on the bill on Aug. 15 and sent the measure to President Roosevelt.

The amendments reduce the chances of the AAA's being declared unconstitutional, since they carefully define and limit the authority of the Secretary of Agriculture. All taxes and benefits now in effect are made legal, as are all contracts, marketing agreements and licenses. The way has been opened for dismissal of suits to restrain collection of processing taxes, the amendments providing a method whereby a processor may sue for recovery of taxes that have not been passed on to the consumer or taken out of the price to the farmer.

The amendments also modify the definition of parity price, so that farmers' fixed charges will be taken into account, and they provide a definite scheme for reducing processing tax rates. If the price is from 100 to 110 per cent of parity for a year, the tax becomes 20 per cent of parity; if more than 110 per cent of parity and less than 120 per cent, the tax will be 15 per cent; if over 120 per cent, the tax is to be 10 per cent.

Other provisions of the amendments establish the "ever-normal" granary plan; make potatoes a basic commodity; put processing taxes on rye and also on barley when and if a barley program is put into operation; replace "licenses" with "orders"; permit payments for removing surpluses, expanding foreign markets and producing under domestic allotment; allow control of imports; and permit appropriations equal to one-third the customs receipts to encourage exports.

The amendments authorize orders in support of marketing agreements only for the following commodities and their products: fresh and dried fruits, except apples and except all canning fruits other than olives; vegetables, but not including vegetables for canning except asparagus; pecans and walnuts; milk; soybeans; naval stores; and tobacco. Price fixing is eliminated for all commodities except milk.



ON TOP AGAIN

James M. Washburne has made a return trip from success to failure. Once head of the Martha Washington chain of candy stores with an annual income of $50,000, he was swept down by the depression and a few weeks ago was selling candy on the streets of New York. Though 80 years old, he set out to make a comeback, peddling a new vegetable candy which he developed himself. Now he is president of a new $1,000,000 concern, James M. Washburne Candy Specialties Corp., with a factory in Long Island City. Joseph B. Kaufman is backing the new venture.

Food Inquiry Authorized

IT LOOKS like a pestiferous winter for food manufacturers. As one of its last acts, Congress passed a resolution calling for a $150,000 investigation of food prices. The measure authorizes the Federal Trade Commission to find out whether producers receive a fair share of the income realized on the retail sale of their products. The idea is to take a look into the practices of processors and middlemen, and specifically to delve into the capital structures of packing companies to determine whether they have been "watered" and if there are excessive writeups in stock values.

Food Bill Held Over

FOR the second time, new food and drug legislation has just missed being enacted as a session of Congress came to a close. This time, the Copeland bill died on third base after being held up in the House for a public hearing, which did not end until Aug. 10.

Various objections to the measure came up at the hearing. Testifying on behalf of Associated Grocery Manufacturers of America, Charles Wesley Dunn favored changes in the bill to limit somewhat the powers conferred upon the Secretary of Agriculture. He also offered an amendment eliminating proprietary foods from the ingredient labeling requirements of the bill.

E. B. Cosgrove, president of National Canners' Association, said that the association was behind the measure "100 per cent," but he urged adoption of an amendment requiring the Secretary to issue standards for fresh fruits and vegetables.

Representatives of the ice cream industry objected to the provisions of the bill making it necessary to indicate on ice cream packages what artificial colors and flavors are used in the product. This, it was alleged, would increase packaging costs because of the large variety of containers needed for the different flavors.

Exemption of dried fruits from the provisions of the bill concerning quality standards was advocated by a dried-fruit representative on the grounds that fresh fruits and vegetables are exempt.

J. R. Manning, of the Bureau of Fisheries, asked that seafoods not be made subject to the poison-limitations of the bill, saying that some seafoods contain more arsenic than the tolerance allowed.

Consideration of the food and drug legislation will be continued during the Congressional recess, and a new bill probably will be passed early next session.

AAA Wins Tax Victories

ON THE run for the past several weeks in the matter of processing-tax suits, the Administration has stemmed the tide with an important victory on the Pacific Coast and with passage by Congress of the AAA amendments. In San Francisco, a United States Circuit Court of Appeals declined to interfere with payment of processing taxes by milling companies in the State of Washington, denying the millers a temporary injunction. Justice Department officials are said to consider this of sufficient weight to offset the unfavorable decision in the Hoosac Mills case at Boston. The AAA also won out in a New York case in which two cigar manufacturers sought to restrain collection of processing and compensating taxes, a United States District Court dismissing the suits. And yet a third victory came in Puerto Rico, where a federal court refused to grant an injunction against the tobacco processing tax.

On the heels of these decisions, Attorney General Cummings indicated that the government would move for dissolution of all temporary injunctions granted by the courts on the strength of the provisions of the AAA amendments. Of almost 1,200 suits, more than 500 involved temporary injunctions.

However, processors won several cases last month. In Chicago, eighteen packers obtained an injunction against payment of $95,000,000 in taxes. Even collection of the processing tax on corn was held up by a temporary injunction granted National Candy Co.

Packaging Show, March 3-6

ALREADY at work on the program for the Sixth Packaging Exposition, American Management Association has decided to hold the event in New York again this year, setting the date as March 3-6. To be in the Hotel Pennsylvania, the 1936 show will include at least 100 different presentations of packaging machinery, materials and supplies. Equally educational will be a four-day series of packaging conferences and clinics to be held in conjunction with the show.

Chadbourne Plan Dropped

ADOPTED five years ago to end the world's sugar troubles by raising prices and getting rid of surpluses, the Chadbourne plan has been scrapped as a failure. While the situation with respect to stocks has improved, prices have failed to come up because of competition from countries not adhering to the plan. So delegates at the International Sugar Conference at Brussels voted to abandon the plan when it expires Sept. 1. The next move to regulate the world sugar market, it was decided, would come at another conference to be organized by the British Government.

Termination of the Chadbourne plan will not affect the United States, as the quotas established under the Jones-Costigan Act restrict imports of full-duty sugars to what is a negligible amount.

QUITS ICE CREAM INDUSTRY

Gus G. Kindervater resigned as president of International Association of Ice Cream Manufacturers on Aug. 15 to go back with his former employer, Anheuser-Busch, Inc., St. Louis, and his work will be carried on until the annual convention by W. R. Cammack, Crescent Creamery Co., St. Paul. In his new position, Mr. Kindervater will assist August A. Busch, Jr., head of Anheuser-Busch.

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Conventions

SEPTEMBER

9-11 — American Fisheries Society, Tulsa, Okla. Seth Gorden, Investment Bldg., Washington, D. C., secretary.

25-27—Association of Ice Cream Manufacturers of Pennsylvania and New Jersey, Berkeley-Carteret Hotel, Asbury Park, N. J.

OCTOBER

8-11—Association of Dairy, Food and Drug Officials, Milwaukee.

12-19 — National Dairy Exposition, Arena, St. Louis.

14-16—International Association of Ice Cream Manufacturers, Hotel Jefferson, St. Louis. Robert C. Hibben, Barr Bldg., Washington, D. C., executive secretary.

17-19 — International Association of Milk Dealers, Hotel Statler, St. Louis, Mo. R. E. Little, 309 W. Jackson Blvd., Chicago, secretary.

18-22 — Institute of American Meat Packers, Drake Hotel, Chicago.

20 (Week of)—American Bakers' Association, Hotel Sherman, Chicago. Tom Smith, 1135 Fullerton Ave., Chicago, secretary.

Poultry Under Stockyards Act

LEGISLATION designed to get rid of unfair and deceptive practices and to eliminate excessive charges in the live-poultry industry has been passed by Congress and was approved by the President on Aug. 14. This bill makes live poultry subject to the provisions of the Federal Packers and Stockyards Act, passed in 1921. It requires that dealers in live poultry, in cities to be designated by the Secretary of Agriculture, must obtain federal licenses and conduct their business under the same general type of federal supervision as already governs the marketing of other livestock. The legislation also provides for establishment of rates and charges and other conditions incident to the proper economical marketing of live poultry. Details of administration will be under the Bureau of Animal Industry. The law covers marketing in a broad sense, including receiving, buying, selling, feeding, watering, hauling, delivering, shipping, weighing, loading and trucking.

Dairy vs. Counter Ice Cream

THE fight between the ice cream industry and the manufacturers of counter freezers, in which the Federal Trade Commission has been acting as referee, has gone two more rounds. On Aug. 8, the FTC withdrew from its complaint against International Association of Ice Cream Manufacturers and six of the largest dairy companies the charges of undue political and legislative activities in various states. The Commission opined that it had no jurisdiction over relations between citizens and state legislatures. But less than a week later, National Association of Counter Freezer Manufacturers appealed to FTC to restore the charges, as a result of which the commission called a hearing on the matter Aug. 23. Whatever is finally done about it, there still stands the Commission's accusation against the ice cream industry of circulating literature defamatory to counter freezers, using fraudulent letters and boycotts and intimidating prospective buyers of counter freezers.

California to Inspect Wine

EVERY GALLON of California wine is to be inspected before it leaves the winery, beginning in September. This is to be done by State inspectors, at the instigation of Wine Institute, in an attempt to gain a larger domestic market. California has approved funds for the inspection, and it adopted standards of quality in April. The standards impose strict requirements, barring any wine which is not the pure product of the grape, which contains an excess of volatile acid, or which is deficient in na-

tural sugar, fixed acids or in alcoholic content.

The state also will enforce requirements as to honest labeling, these provisions being similar to the wine regulations which the Federal Alcohol Control Administration had intended to place in effect. The vintners feel sure of success under the new program because "Americans will buy wines when they are assured of quality."

Meat Prices Make Trouble

HIGH meat prices resulting from the shortage of supplies have thrown consumers, packers and the AAA into a three-cornered squabble. Picketing housewives in Detroit have continued their boycott against meat shops until many have been forced to close. A delegation of these women went down to the banks of the Potomac to see Secretary Wallace on Aug. 19, and the Secretary explained the cause and effects of the situation. But feminine logic still reached the conclusion that meat prices were too high, and the delegates asked an immediate profiteering investigation of Detroit meat packers and demanded a flat reduction of 20 per cent in all meat prices. Meanwhile there appeared in the press statements attributing the present shortage of hogs and the high prices of meat to the activities of the AAA. The Secretary accused the packing industry of issuing false propaganda and told the country that if the AAA hadn't reduced supplies the shortage of feed caused by the drought would have. Whereupon the Institute of American Meat Packers issued a statement to clear the industry of the Secretary's charges.

Steps Up Wheat Acreage

SEVERE losses to the wheat crop, occasioned by the spread of rust in the spring wheat areas and by drought conditions in some states, have prompted the AAA to boost the acreage of wheat allowed in 1936 to 95 per cent of the base figure. A few weeks ago the allowed acreage was placed at 85 per cent of the base, but a crop report on Aug. 9 indicated a decrease of 123,000,000 bu. from the previous month, so a change seemed advisable to assure ample domestic supplies and to strengthen the country's position in the world export market.

Rice Taxes Changed

MILLED RICE has been separately defined as "brewers' rice" and "other milled rice" by the AAA in connection with the processing tax. Effective Aug. 1, the new regulations also establish separate conversion factors for these products and re-establish factors for articles made directly or indirectly from them. The factor for brewers' rice is changed from 144 to 75, that for other milled rice from 144 to 145. There being no floor-stock taxes on rice, the principal effect of the new regulations is to decrease the import-compensating tax on imported brewers' rice from $1.44 to $0.75 per 100 lb. This change was requested by United States Brewers' Association on the basis that the tax was prohibitive and the domestic supply below the demand.

Act on Milk Laws

LAST MONTH saw Senate action on a federal bill and two court decisions on state laws affecting the dairy industry. The Senate passed and sent to the President on Aug. 19 a bill amending the Filled Milk Act to place its enforcement under the Department of Agriculture and authorizing an appropriation of $10,000 for enforcement. One of the court decisions involved the much contested advertising differential of one cent a quart established by the Milk Control Law of New York. This again has been held constitutional by a special statutory court which recently was directed by the Supreme Court to review its findings in the Borden milk-rate case. The other court ruling, made by the Supreme Court, holds Maine's milk dealer bonding law unconstitutional.

Ordered to Change Ads

TWO MORE food companies have been put on the carpet by the Federal Trade Commission for inaccurate or misleading advertising. General Foods Corp., New York, and the affiliated companies, General Food Sales Co., Inc., and Maxwell House Products Co., Inc., were taken to task for radio advertising stating that loose or bag coffee loses 45 per cent of its flavor nine days after roasting, and that the loss in flavor of bean coffee is only slightly less rapid, so that the buying of unground coffee offers little advantage to the consumer. General Foods has entered into a stipulation to desist from these representations.

The other case was against Pioneer Maple Products Co., St. Paul, which is charged with inferring in its advertising that its product is pure maple syrup, when, according to the FTC, it consists of approximately 70 per cent cane syrup.

GETS FEDERAL JOB

Ernest G. Draper, a vice-president of Hills Bros. Co., New York, since 1920, has been appointed Assistant Secretary of Commerce. Mr. Draper, who is also a vice-president of Dromedary Co. of California and a director of Scoville Canning Co., has served on the Business Advisory Council and has been a student of labor problems.

Concentrates

THE PATMAN BILL, aimed at the chain stores, is expected to remain in committee until Congress convenes next January . . . A complaint by the Federal Trade Commission charges Carey Salt Co., Hutchinson, Kan., with unfairly advertising as "smoke salt" a product not subjected to smoke sufficiently to acquire smoke-salt properties.

VITAMIN E has been prepared in highly concentrated crystalline form by Prof. Herbert McLean Evans, University of California . . . Of the gages tested during one month by the service laboratory of American Bottlers of Carbonated Beverages, not one was accurate . . . A grant of $5,000 for a study of the place of sugar in the curing of meat, to be carried out by Institute of American Meat Packers, has been made by Corn Industries Research Foundation.

THE DEPARTMENT OF COMMERCE will issue fortnightly a new trade-promotion service designed to assist in increasing exports of sugar, confectionery, nuts and allied products; cost, $1 annually . . . Dairy specialists at New York State Agricultural Experiment Station, Geneva, found in a recent study that analyses made from weigh-vat samples of milk give a more representative bacterial count than those from single cans . . . University of Minnesota announces a six weeks' creamery operators' short course from Jan. 9 to Feb. 20.

A HEARING on the frozen-swordfish tariff will be held Sept. 17 at the offices of the Tariff Commission, in Washington . . . With the aid of a recent $20,000 allotment, the Bureau of Fisheries will study the effects of stream pollution on oysters in the York River, in Virginia . . . A booklet, "The Amended Modernization Credit Plan," has been issued by Federal Housing Administration.

Men . . . Jobs . . . and Companies

Industry

• AMERICAN SEEDLESS RAISIN Co. has disposed of its packing facilities, including the plant at Del Rey, Calif. The company will operate its vineyards under the name of American Vineyards Investment Co.

• ARMOUR & Co., Chicago, has contracted to purchase Jacob E. Decker & Sons, which has a packing plant at Mason City, Iowa, and several branch houses. Owned by Adolf Gobel, Inc., the Decker plant has a capacity of 750,000 hogs annually. Armour also recently purchased Wilson Provision Co., a $300,000 packing firm at Peoria, Ill., and the company has opened a new cheese plant at Woodbury, Tenn.

• BUFFALO (N. Y.) FLOUR MILLS Co., a unit of Commander-Larabee Corp., is doubling the capacity of its plant.

• CORN PRODUCTS REFINING Co. has closed its plant at Pekin, Ill., because of opposition to the free entry of blackstrap molasses and tapioca starch in competition with Illinois corn.

• DAYTON (Ohio) FOOD PRODUCTS Co. has moved to larger quarters where it has two new laboratories, a cold storage plant, a large display room and more shipping facilities.

• FOOD CONCENTRATES, INC., subsidiary of United Fruit Co., will distribute "Meloban," a powdered-banana product, exclusively through Nulomoline Co., New York.

• GEORGE A. HORMEL & Co., Austin, Minn., has added "Tomato Bretonne" to its line of soups.

• ISLAND CITY PICKLE Co. will erect a new pickle factory at Eaton Rapids, Mich., to replace the one recently destroyed by fire with a loss of $25,000.

• JERSEY CEREAL Co., Cereal, Pa., has opened a branch plant at St. Joseph, Mo., to make bran and corn flakes.

• LIBBY, MCNEILL & LIBBY, Chicago, will sell a new issue of bonds to refund outstanding ones.

• JOHN MORRELL & Co. is improving its Ottumwa, Iowa, plant at a cost of $1,500,000.

• NATIONAL COTTONSEED PRODUCTS CORP. has sold two mills to R. E. Lillard, Fort Smith, Ark. This is in connection with the reorganization of the company.

• PHILLIPS PACKING Co., INC., Cambridge Md., won the Diploma of Grand Prize and the Gold Medal for canned foods exhibited at the General Trades International Exhibition in London. Products from 30 nations were in competition.

• PLACENTIA (CALIF.) ORANGE GROWERS' ASSOCIATION has rebuilt its packing house.

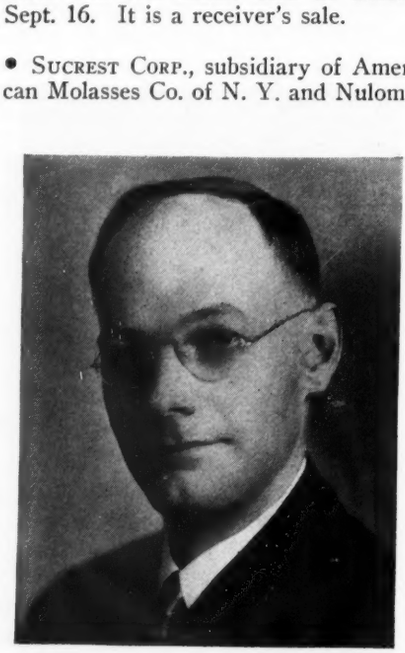
• RATH PACKING Co., Waterloo, Iowa, is making additions to its plant.

• ROCHESTER (N. Y.) PACKING CORP. has gone into receivership, maintaining that, while solvent, it could not pay processing taxes and meet other obligations.

• SOUTHERN DAIRIES, INC., will construct a new plant at Savannah to replace one recently sold to a brewer.

• SPRECKELS SUGAR CORP., Yonkers, N. Y., will have its machinery, equipment and real estate sold at auction Sept. 16. It is a receiver's sale.

• SUCREST CORP., subsidiary of American Molasses Co. of N. Y. and Nulomoline Co., is erecting a modern sugar refinery in Brooklyn, N. Y. The refinery, which will have a capacity of 3,000,000 bags annually, is designed to operate at high efficiency and low overhead. It will specialize in exceptionally white sugar of low ash content.



ROWLAND J. CLARK

He has been appointed associate professor of milling industry at Kansas State College, effective Sept. 1. Recently chief chemist for Michigan Bakeries, Inc., and previously with American Dry Milk Institute, Schulze Baking Co. and Goerz Flour Mills Co., Mr. Clark has had wide practical experience. He was president of American Association of Cereal Chemists in 1925-26.

• SUSSMAN, WORMSER & Co. recently opened a plant at Stockton, Calif., to cull, grade and pack cherries in brine. Stockton is a deep-water seaport.

• TOBIN PACKING Co. will double the storage and freezing capacity of its plant at Fort Dodge, Iowa, by a $6,000 addition.

Personnel

• ROSS E. ANDERSON takes up new duties as vice-president and general manager of Red Star Milling Co., Wichita, Kan., Sept. 1. The company is a General Mills subsidiary.

• WILLIAM ARENDSHORST, manager of a National Biscuit Co. plant at Holland, Mich., has resigned.

OTTO H. BARMETTLER recently resigned as a vice-president of National Biscuit Co. and manager of its Omaha plant to form Iten-Barmettler Biscuit Co., which is capitalized at $1,000,000 and which will begin operations in a new plant at Omaha about April 1. Besides Mr. Barmettler, who is president, the officers are Fred G. Salerno, vice-president; and W. R. Avery, secretary-treasurer. The directors include Mrs. Katherine C. Iten, widow of the former head of Iten Biscuit Co., and Richard O. Barmettler, son of the president. Otto H. Barmettler has been interested in Salerno-Megowan Biscuit Co., Chicago, of which Mr. Salerno is president, but the two companies will be separate. And he was manager of Iten Biscuit Co.'s Omaha plant for twenty years before it merged with National Biscuit in 1928. Mr. Avery formerly was treasurer of Iten.

• RICHARD BEAN, formerly president of Washburn-Crosby Milling Co., Louisville, has become assistant to S. C. Hutchison, president of Mountian City Mill Co., Chattanooga.

• GEORGE K. BLACK again heads up Massachusetts Brewers' Association; Edward J. Glynn is vice-president.

• MAX F. BURGER has recently been named secretary of National Confectioners' Association.

• R. S. CASTLE now is vice-president of United Packing Corp., Oakland, Calif. He had been with Normal L. Waggoner Co.

• CURTIS D. CECIL, formerly exposition director for American Bottlers of Carbonated Beverages and a secretary of the bottled-soft-drink Code Authority, resigned recently.

• PAUL A. DEET, general manager of the Sioux City plant of Armour & Co. for two years, has been made manager of the Kansas City plant. He is succeeded by Clarence Matthews.

• HARRY EPSTEIN has been made president of Meadow Gold Ice Cream Co., Brooklyn, N. Y., to succeed H. P. Beard, resigned. He had been a sales executive of the Beatrice Creamery Co. subsidiary.

• LON P. FLANIGAN, Seneca Kraut Pickling Co., Geneva, N. Y., again has been made president of National Kraut Packers' Association.

• EDMUND P. KELLY has been re-elected president of Capital City Products Co., Columbus, Ohio. Wade E. Utley was renamed vice-president and secretary, while LeRoy Bradford was again made treasurer.

• GERALD S. KENNEDY, in charge of the grain department of Washburn Crosby Co., Inc., Buffalo, since 1920, has been promoted to vice-president. Harry W. Pettibone was advanced from general sales manager to vice-president; Ralph S. Herman, from the bakery-service department to vice-president.

• C. B. LOTT became a vice-president of Washburn Crosby Co., Inc., Chicago, on Aug. 15.

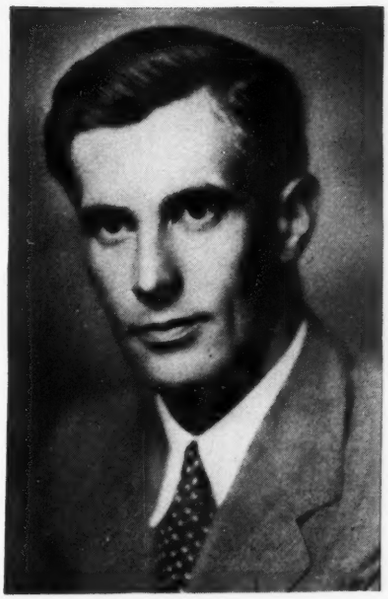
• ROLAND MCHENRY is now vice-president of Star Grain Co., Chicago, a subsidiary of General Mills, Inc.

• R. WALLACE MITCHELL has taken the position of chemist in charge of the laboratories of Purity Bakeries Service Corp., Chicago, recently vacated by Mrs. Mary Brooke, who went with Puritan Mills, Inc. Mr. Mitchell formerly was with American Bakery Materials Co., Menominee, Wis.

• F. W. NORTON now is managing Craig's Bakery, Columbus, Ga.

• PHILIPPO PIZZO, former president of Wyandotte Candy Co., recently formed Detroit Confections to manufacture a line of candy and gum novelties.

• KENNETH S. ROHRBAUGH now is a chemist for Majestic Milling Co., Aurora, Mo.



CLARENCE GATES

He recently was appointed supervisor of production and development activities of Maxwell House plants in Jacksonville, Houston, Los Angeles and Brooklyn. He continues as superintendent of the Brooklyn plant, which position he has held since 1929.

• W. C. ROHRBAUGH, recently a chemist with Dodge City (Kan.) Flour Mills Co., now is employed by Springfield (Mo.) Flour Mills.

• MALCOLM D. SMITH, for the last three years manager of Wonder Bakery, Little Rock, Ark., has been promoted to district manager of Continental Baking Co. in the Southwest.

• ANDREW TEHEL recently became superintendent of Up-To-Date Candy Manufacturing Corp., New York. Mr. Tehel has a reputation as hard-candy expert.

• JOHN E. WILSON, manager of the construction department of Swift & Co., Chicago, has been promoted to general superintendent. He started with Swift as water boy on a construction job in 1902.

Deaths

• C. F. CLAUSSEN, 40, secretary of C. F. Claussen & Sons, Inc., Chicago pickle packers, Aug. 6.

• WILLIAM H. GAVIN, 57, superintendent of Pratt-Lowe Preserving Co., Santa Clara, Calif., at San Jose, recently.

• GEORGE H. JOHNS, 54, pioneer pretzel manufacturer of Buffalo and a member of National Pretzel Association, July 26.

• JOHN R. KINGHAN, 60, chairman of the board of Kingan & Co., Indianapolis, in Ireland, recently. He came to this country from Ireland in 1902 to go with Kingan & Co., founded by his father and two uncles.

• GEORGE P. REUTER, 56, since 1929 special representative of Standard Brands, Inc., and formerly vice-president and director of Malt Diastase Co., at Jamaica, N. Y., July 28. He had been in the baking industry for 40 years.

• CONRAD SCHLUDERBERG, 94, pioneer meat packer in Baltimore, Aug. 18. Born in Germany, he came to this country in 1851.

• P. A. TWISS, 59, general superintendent of plant and equipment for Swift & Co., Chicago, Aug. 1. He had been with Swift since 1896.

• GEORGE B. WATTS, 73, former treasurer of National-Huntley Dairy Co., July 24. He had been a leader in the milk industry of Chicago for 30 years.

Associated Industries

• AMERICAN CAN CO. will erect a $1,000,000 plant at Tampa, Fla.

• HAROLD BOESCHENSTEIN has been elected vice-president and general manager of Owens-Illinois Glass Co., Toledo.

• CARRIER ENGINEERING CORP., Newark, N. J., announces arrangements for long-time financing of air conditioning and commercial refrigeration installation under the FHA National Housing Act.

• CELLULOID CORP., Newark, N. J., announces these appointments: E. W. Ward, director of sales of the "Protectoid" division; W. K. Woodruff, Chicago district manager; A. J. St. John, advertising manager.

• FOUR WHEEL DRIVE AUTO CO., Clintonville, Wis., announces appointment of Chester J. Roberts as assistant general manager and Robert C. Geffs as assistant sales manager.

• INSTRUMENT REBUILDERS AND REPAIR CO., Hoboken, N. J., recently was formed to rehabilitate obsolete, broken, discarded or inaccurate instruments.

• HARVEY H. MILLER, head of H. H. Miller Industries Co., Canton, Ohio, died Aug. 3.

• GEORGE E. WALLIS, president and general mangaer of Creamery Package Manufacturing Co., succeeds the late H. A. Keiner as head of the Dairy and Ice Cream Machinery and Supplies Association.

Books Received

HAND BOOK OF CHEMISTRY AND PHYSICS. Published by Chemical Rubber Publishing Co., Cleveland, Ohio, 1935. 1,933 pp.; 4½x6¾ in.; flexible. Price $6.

Through nineteen editions this familiar and authoritative reference book has been enlarged and kept up-to-date with advances made in the field of chemistry and physics. This last edition is larger by 95 pages than the eighteenth (1934) edition; a single table of X-ray crystallographic data accounts for 43 of them; 89 pages have been revised and the tables of data enlarged. Its contents are grouped under five classifications: Mathematical Tables; Properties and Physical Constants; General Chemical Tables and Specific Gravity and Properties of Matter; Heat and Hygrometry, Sound, Electricity and Magnetism, and Light; and Quantities and Units and Miscellaneous Data.

HEATING AND AIR CONDITIONING. By John R. Allen and James H. Walker, Published by McGraw-Hill Book Company, Inc., 330 West 42d St., New York, N. Y. 1935. 440 pp., 6x9 in., illustrated, cloth. Price, $4.

The main feature of this fourth edition of the text book formerly called "Heating and Ventilation" is an extended discussion of modern air conditioning. In fact the addition of this material is the reason for the change in name. A new, revised chapter on hot-water heating systems, by F. E. Giesecke, of the Agricultural and Mechanical College of Texas, has been added, to replace the former treatment of the subject.

To keep the work within the bounds of a classroom textbook, the older matter dealing with heating systems has been revised, brought up-to-date, and shortened. As a result, the new edition covers considerably more ground in approximately the same number of pages.

For readers in the food industries, where air conditioning is becoming an increasingly important factor, this book gives a brief, but thorough and interesting discussion of the theory and equipment involved.

EXCHANGE FUTURES TRADING IN CANNED FOODS. Published by The Commercial Exchange of Philadelphia, Philadelphia, Pa. 1935. 16 pp., 8½x11 in.; paper, illustarted. Price, 10 cents.

Providing facilities for open trading in canned vegetable packs is only one of the pioneering activities of the Commercial Exchange of Philadelphia. Another is the compilation and publishing of tables and charts giving the canning period and size of pack, distribution of pack by can sizes and comparative relationship of the various cans to No. 2's, geographical presentation showing approximate volume and location of pack, and total supply and average season price per dozen No. 2 cans for peas, corn, tomatoes, and green beans. Also included are definitions and information on terms of trading, explanation of the reason for trading futures, and listing of representative freight rates to Philadelphia, warehouse storage and handling charges, approved warehouses, and members of exchange engaged in the canned foods industry.

FOODS AND THE LAW. By Alexander P. Blanck, Member of the New York Bar. Published by Peter Smith, 347 Fifth Ave., New York, N. Y. 1935. 246 pp.; 5½x8 in.; cloth. Price, $2.50.

Designated as a manual for the business man on the laws of the United States with reference to food and food products, this book is in fact an exposition on these laws and regulations as well as a reference book containing the text of the Aug. 1, 1933, revision of the Food and Drug Administration definitions and standards and the tenth revision of the 31 regulations for the enforcement of the Food and Drug Acts.

Only subject matter pertaining to foods is included. The expository subject matter is divided into two parts: Part I defines the act and discusses what and who is affected by it, and in what respect foods are considered to be manufactured or sold in violation of its terms; case citations and decisions rendered are given as explanation of disputed points. Part II deals with foods and food products covered by special laws in addition to the Food and Drug Act.

Food manufacturers, packers, importers, exporters and merchandisers are affected by the subjects discussed.

ANNUAL SURVEY OF AMERICAN CHEMISTRY FOR 1934. Edited by Clarence J. West, Director of Research Information Service, National Research Council. Published by Reinhold Publishing Corp., 330 West 42d St., New York, N. Y. 1935. 396 pp.; 5½x8½ in.; cloth. Price $4.50.

Chapters on Food Chemistry in 1933 and 1934 by H. C. Sherman, Fermentation by Ellis I. Fulmer and Leo M. Christensen and Alcoholic Fermentation and Beverages by Alfred J. Liebmann attract the attention of technical workers in the food field to Vol. IX of this summary of accomplishments in chemical science. The usual chapter on biochemistry has been omitted because of the scope covered by the Annual Review of Biochemistry published by the Stanford University Press.

From the contents of the 25 chapters, half of which are devoted to industrial topics, industry trends as well as technical accomplishments may be ascertained. This survey is published annually for the National Research Council.

Job Analysis

(Continued from page 440)

amount of bonus to be earned by high-grade operation must be large enough so that the foreman feels that the effort is worth while. Incentives for non-productive workers such as mechanics are usually based on the cost per unit of product or on meeting an established budget.

One of the benefits of the detailed time study and motion study is the discovery of the proper manner of attack for reducing the time required to do a job. I refer here to improvements made on the part of the management, such as realignment of working positions, addition of attachments to machines, or the development of hand tools.

A detailed study likewise will frequently disclose the weak points of certain employees as are sometimes found on a certain part of an operation where one packer may be taking twice as much time as another. Careful investigation discloses that the slow individual is using an entirely different method of packing. The remedy is obviously better training in the correct method. In connection with training, the selection of personnel is important and should be under the guidance of numerous practical tests available to prevent the employment of unsuitable persons. After training has begun, records of daily performance or even of hourly output are a profitable investment. Here again the application of incentives to learners and instructors is frequently worth while. We may reward beginners for the attainment of a certain standard within a specified time. Also, we may pay the instructors a bonus based upon the performance of those receiving instructions.

In most factory operations, the management knows less about the job than does the worker. Yet a new employee is often expected to learn in a half day a job which an experienced worker can do but cannot explain; much less can the management familiarize her with it. For obvious reasons exact details of the motion should be known to some responsible person in the management—such as a foreman—and he must be able to transmit them by demonstration to the beginner.

We must state as a very important rule that the results of detailed time and motion study, of learning progress records, and of cost and production records become more valuable as they are made available to foremen and are understood by them.